Building safer communities : Developing coordinated approaches to investigating and preventing fires.

This programme was funded by the Scottish Universities Insight Institute, and ran from December 2011 to February 2012. The programme team members were:

- Prof. Niamh NicDaeid, Professor of Forensic Science, Centre for Forensic Science, University of Strathclyde
- Prof. Sue Black, Professor of Anatomy and Forensic Anthropology, Dundee University
- Mr Gary Holcroft, Head of Physical Sciences, Scottish Police Services Authority Forensic Services

Note:

The Scottish Universities Insight Institute supports programmes of enquiry which facilitate interaction between different academic disciplines and institutions and members of wider communities in the public sector, business and the third sector, to bring fresh insights to substantial issues that face Scotland and the wider world.

It is a joint venture between six Scottish universities:
Aberdeen, Dundee, Edinburgh, St Andrews, Stirling and Strathclyde.

Preface

The development of forensic science quality standards based on advice from experts in the field is crucial to my vision for a UK-wide quality culture for all aspects of forensic science. I have been pleased to be part of this project and welcome the opportunity it presented to discuss quality standards for fire scene investigations with world leading experts.

I endorse and agree with the recommendations for the next stages; Scotland is in a unique position to advance in this area with the support of the police, fire and rescue service and the Scottish Police Services Authority.

The leadership, research input and expertise of Strathclyde University adds an additional advantage. Scotland leads the way for the UK on this project, which has my full support.

Andrew Rennison M.Sc
Forensic Science Regulator,

October 2012

Contents

1. Programme purpose and approach

a. Background

The Investigation of origin, cause and development of fires is a critical issue for the design and development of a safer built environment, understanding human behaviour in fire events and the successful resolution of both civil and criminal proceedings. Approximately 565,000 fires incidents were recorded in the UK between April 2009 and March 2010. This resulted in 375 fatalities, 9,695 non-fatal casualties and an estimated cost to society of 2.5 billion pounds. Depending on location, many of these incidents may be started deliberately, however subsequent incident investigations result in less than 10% convictions.

Previous reports relating to fire investigation in the UK[1] established the need for a multi agency approach to the problem. The development of the arson control forum (in 2001) and subsequent arson task forces across England and Wales has had some impact on the issue in that jurisdiction. No such forum exists in Scotland despite the recommendations of the Association of British Insurers [2] and more recently Strathclyde Fire and Rescue Services and the Scottish Government[3] all of which advocate a multi agency approach to engage with the problem. Currently, while there is generally goodwill within groupings involved in the fire investigation communities, there has been little successful effort in Scotland to develop a collective strategic approach to incident investigation across the stakeholder communities. Collaborative fire scene investigations are capable of providing reliable information and facilitating the understanding of the effect of fire related incidents on the built environment as well as human behaviour in fire and, as a consequence, inform the development of safer communities producing significant benefits and impact. Statistics relating to fire cause, gathered by the fire service, are already used to inform government and develop strategic interventions in relation to fire safety. The cross fertilisation of industrial and academic research between the various stakeholder communities facilitated by interaction and the agreement of common goals can also bring with it enormous benefit, particularly in the cross over areas of fire science, fire engineering and computer modelling.

In Scotland, the introduction of the Fire Scotland Act (2005) provided the Scottish fire and rescue service personnel with specific powers to search and recover items from fire scenes. These wide ranging legal powers provide direct responsibilities for the gathering of materials from fire scenes and individuals. Such materials could have potential evidential value particularly in civil proceedings but also potentially in criminal cases. The current civil situation raises the question of establishing the extent to which scientific and forensic evidence, obtained through the investigative process, is used in trial and how the fire service investigations interact with the civil fire investigation. In particular, the issue of training in documentation of evidence recovery, appropriate means of recovering items from fire scenes as well as storage

[1] Arson scoping study, 2000
[2] Fire Investigation in Scotland, 2004, Tackling Fire: A Call For Action, 2009
[3] Scotland together, 2009

are all areas requiring a clarity of approach. In suspected criminal cases, authority over an incident is retained by the police and ultimately the Crown Office Procurator Fiscal service.

The interaction between the procurator fiscal, police, forensic science and fire service at a multi agency level can be *ad hoc* with local arrangements in place but no published Scottish National strategy. Both the 2004 ABI[2] report and the Strathclyde Fire and Rescue Services and Scottish Government[3] call for the development of a more strategic approach to the interaction between agencies involved. The 2009 ABI[2] report also specifically suggests the interaction of the fire science and fire engineering communities to round out the debate and better understand the fire performance of Modern Methods of Construction (MMC) building types and how to reduce the risks associated with them.

In Scotland, there is a current opportunity to consider the development of a combined strategic response to fire scene investigation, at least within the criminal justice sector, as the fire and rescue services and police forces in Scotland merge into single organisations. Scotland also leads the UK in the development of forensic science research within higher education including a focus in fire investigation and fire science/engineering.

b. Programme aims and objectives

The programme aimed to evaluate the current Interaction between the various agencies involved in fire investigation within both the civil and criminal arena. With the aid of international experts, the programme therefore set out to establish first, the current state of awareness, training, experience and interaction between the crown office, fire service, forensic science, police, crime investigation support officers, civil and academic sectors. Secondly, the specific requirements and benefits related to the use of other specialists in the investigation of fatal fires were explored. Finally having established that backdrop, the programme sought to review the current status of training and standards in light of developments, especially in England and Wales, the USA, Australia and Europe and where appropriate, make recommendations for the development of fire investigation in Scotland.

c. Format and structure

The programme consisted of three two day workshops which addressed three critical and interlinked themes and one follow up meeting which focussed on the next steps for the project. The format of the first three workshops was a series of PowerPoint presentations addressing one or more aspects of the research questions and building progressively on the work and discussion arising out of previous sessions. Across the six days of the three workshops of the programme, 28 presentations were delivered from speakers, including academics, police, fire and rescue service personnel, fire scientists and engineers and forensic science specialist practitioners. Each presentation was followed by a discussion session which maximised collective engagement with the debates and ensured exposure to all of

the arguments. A solid core of participants attended every session which enabled a clear and sustained focus throughout the programme. The programme greatly benefited from the expert contributions from colleagues from England, the USA, Australia and Europe.

2. Thematic focus of the workshops

a. Key themes addressed

The workshops addressed a number of research questions grouped under the following key themes :

- Fire scene investigation and the development of a multidisciplinary approach
- Critical issues in the investigation of fatal fires
- Training, knowledge transfer and assessment of competence in fire investigation

The presentations within each workshop and the subsequent discussion which they provoked facilitated a deepened debate around the research questions associated with each workshop and the program as a whole. The representation from across the sector and in particular the international perspective, provided a basis for a shared understanding of the issues and the emergence of other key factors and issues allowing the programme to be re-focused as required during and between the workshops.

b. Workshop 1: Fire scene investigation and the development of a multidisciplinary approach.

The first workshop focused on the scene investigation across a range of stakeholders (see appendix 2 for detailed schedule). The investigative response is based on a levels model where the majority of fires attended are at level 1 (suggested as 97%) and are investigated (often) by the first attending fire officer alone based on their individual knowledge, skills and experience. These officers provide a 'supposed cause' based on the information available at that time of their investigation. The fire officers conducting level 1 investigations appear to receive little, if any, systematic training in fire cause or in the determination of origin and fire development. Thus, it would appear that the vast majority of fires are being investigated by the least experienced and trained officers. This has significant implications, particularly for the private insurance investigations where private sector fire investigators, most often highly qualified and experienced in fire investigation, may not always be facilitated in access to the fire scene until after lesser experienced and ill equipped fire service officers have conducted their own investigations.

If the fire falls out with the level 1 criteria, officers with additional training will be requested to attend. Level 3 fires always demand a multi agency response. The

definition of the criteria and separation between the levels appears to be ill defined and may require attention. The triggers for deployment from level to level may be different between the existing fire and rescue services and police forces in Scotland and more consideration may be required for defining the levels and response requirements particularly across the regions once the new services are realigned and consolidated under their individual banners.

In some circumstances systematic failures leading to fires can occur (for example faults in electrical appliances) which can be identified through scene investigations and fed back to the fire investigation community. Concern was raised in relation to the importance of level 1 investigations and the quality of the output in terms of the recovery of vital statistical information to inform government and consequently building standards and similar agencies. The continuance of these scene investigations was thus considered of real significance and the role of the level 1 fire investigators critical in this regard. However the accuracy and completeness of the derived data is brought into question by the deficiencies in training of personnel involved in fire investigation at level1.

The use of fire science, fire engineering and computer modelling in fire investigations was presented, exploring the USA, European and UK perspectives. In the majority of cases the fire investigation will not require the assistance of a Fire Engineer or scientist. Whilst some work has been undertaken by fire engineers in relation to fire investigation specifically, the suitability and fitness for purpose of the models to the task at hand may be questionable. It was evident that the appropriate implementation of fire modelling required a considerable understanding of the wider field including, specifically, the limitations of the models and the caveats required for their appropriate use in suggesting fire development. In a similar fashion, the use of computer modelling as a predictive tool for fire behaviour required caution and appropriate training. In fact, such models do not follow the same deductive reasoning required in fire scene investigation (where the investigator uses determined facts and evidence to evaluate hypothesis as to origin and cause of the fire through appropriate interpretation). Rather, the model suggests specific explanatory hypothesis and explores the effects which may arise as a result. The problem becomes more acute if these tools are presented as evidence for the courts to consider without appropriate clarification as to their methodology and limitations.

The interfaces between the various agencies and, in particular, the public and private sectors were explored and carried into further workshops where they were specifically developed. It was noted that this was an opportune time for the discussion relating to a unified approach to fire scene investigation in Scotland, given the impending amalgamation of both the police forces and the fire and rescue services into single national agencies, as well as the reorganisation and focusing of the forensic science provision in Scotland. The important role of the Crown Office Procurator Fiscal Service in this regard was also discussed.

c. Workshop 2: Critical issues in the investigation of fatal fires.

The theme of the second workshop was the investigation of fatal fires. Here the focus was on the different specialists who can be called to attend such scenes and the advantages these can bring to the process. The publication of the 'Scotland Together' report[3] combined with on going research and recent cases involving fire fatalities maintains the high profile of these types of fires many of which will draw media attention.

The involvement of a variety of forensic specialists requires the highest degree of cooperation between the investigators. When deaths occur in a fire, the events can become the focus of the media and the public as well as police, fire, insurance, forensic and legal professionals. When problems occur, they can have far-reaching consequences. The roles of the forensic pathologist, archeologist, entomologist, odontologist and anthropologist were discussed and the use of such specialists within a multi disciplinary team can be very advantageous.

Fires can be intentional, natural, or accidental in their cause, and deaths can be accidental, homicidal, suicidal, or natural. The linkage between the two events can be direct, indirect, or a simple coincidence. The responsibility of the investigation team in fatal fire cases is to establish the cause of both the fire and the death and to determine the connection (if any) between the two. The levels of expertise and competence within these practitioner groups for the investigation of fatal fire incidents in Scotland and the UK can be highly variable within and across the various sectors involved. This exposes potential weaknesses in the *ad hoc* engagement of specialists whose competence for such investigations may be under question and reinforces the notion that a multi agency approach including competent specialists and fire scene investigators has specific advantages. In Scotland, the use of specialist investigators in an incident is frequently recommended by the Scottish crime investigation support officers. The role of these officers leaves them free to advise investigation managers regarding the use of private sector, other forces, military and academia as appropriate and the assurance that such individuals are appropriately qualified is essential. It is also recognised than such experts may not necessarily come from within a traditional forensic service provider.

After death, post-mortem effects on the body can complicate the investigation by the obliteration of evidence. The body can bear fire patterns of heat effects and smoke deposits that can be masked by exposure to fire after death. The body can be incinerated by exposure to flames such that evidence of pre-fire wounds or even clinical evidence such as blood samples can be destroyed. Much research into the movement of bodies as a consequence of fire and heat exposure is ongoing and valuable in providing an enhanced understanding of the effect of fire on the body. The premature removal of a deceased victim from the fire scene can also compromise the subsequent fire scene investigation. Burn patterns, body fragments, projectiles, clothing and associated artifacts can be lost by the undocumented and hurried removal of the remains. The most successful fatal fire investigations will

occur when a pre-planned team is able to participate from the start of the scene investigation.

The complex interaction of the different agencies involved in fire investigation was extensively discussed. The role of the Crown office in such cases is particularly important and clear lines of understanding and communication in relation to such incidents, particularly multiple fatalities is critical. Most arrangements, particularly between the private and public sector remain *ad hoc* with many based on personal relationships built up over time rather than formal inter-operating protocols. The sharing of information in a productive and timely manner is an important aspect to fire scene investigation and in particular to issues where, for example, a series of appliance fires may lead to a product recall. The provision of a feedback loop to fire science and fire engineering is also critical, particularly when failures occur. For some investigations where the provenance (criminal or civil) may be uncertain in the early stages of the incident there appears to be no formal structures for management of the investigation with various consequences arising as a result. Future interaction models (figure 1) may need to take this into consideration defining how and under what circumstances the private sector become involved and clearly articulating management and information sharing activities.

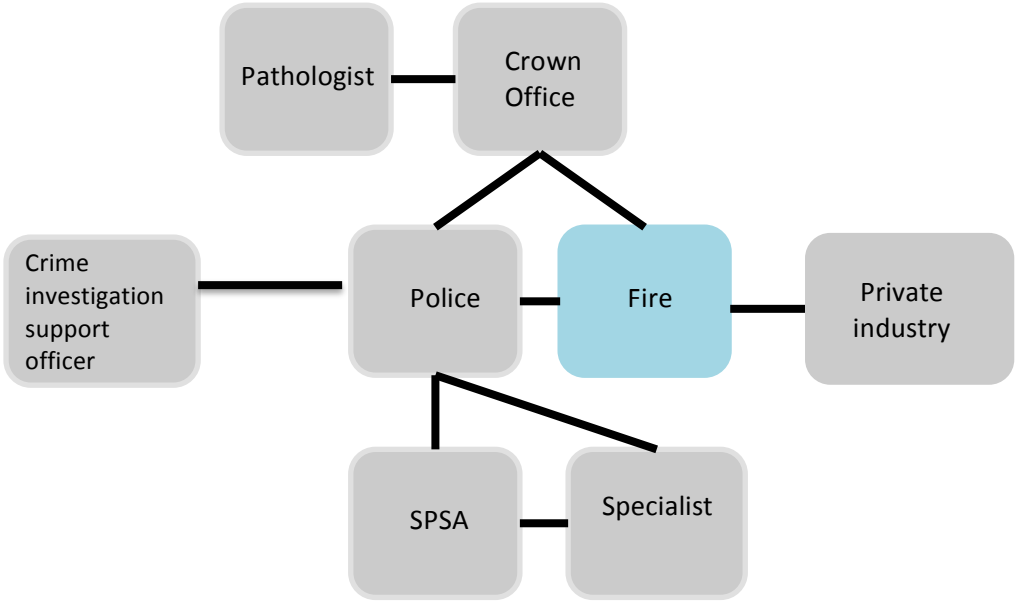

Figure 1 : Basic fire investigation investigative map

The concept of investigative route maps was also discussed and further articulated in the third workshop. The general view was that it would be helpful to produce such maps and use these to provide a framework for the development of appropriate protocol agreements for effective working.

d. Workshop 3: Building better investigative teams : training, knowledge transfer and assessment of competence in fire investigation

The issue of training, competence and fitness to practice is complex within the fire investigation community and affects both the public and the private sector. This is not simply a Scottish or UK wide experience but was articulated also by participants from Europe, the USA and Australia.

The Scottish fire and rescue services have established their own accredited national fire investigation course set against the current National Occupational Standards (NOS). This course has been implemented for those most likely to respond to level 2 and 3 fires. Training for forensic scientists and the private sector seems to rely predominantly on the individual's educational background and the majority appear to base development on attendance at some existing fire investigation training courses (many of which may not be accredited or address the current NOS) and mentoring through scene attendance by more senior members of staff. Other organisations such as including the Institute of Fire Engineers and the International Association of Arson Investigators have discussed and developed educational/training frameworks. However, a coordinated and joined up approach may be required to further develop the training landscape within the discipline while also being mindful that the legal landscape within Scotland is different to England, Wales and Northern Ireland.

The development of the role of the forensic science regulator and the increased drive towards accreditation both in England and Wales as well as Europe will drive the agenda forward for practitioners working within the criminal justice system. The fire and rescue services are very familiar with competency issues and have in place systems for operational officers to demonstrate competence. The development and agreement of a set of National Operational Standards for fire scene investigation, presented by Skills for Justice, addressing aspects of fire investigation and satisfying the requirements of both the criminal and civil judicial systems was discussed. This provides a set of criteria against which competence can be assessed. A number of minor amendments to the current NOS were suggested and discussed, particularly in relation to the use of fire science, fire engineering, computer modeling and fire scene reconstruction.

A means of implementation of the standards within a quality framework and an external method of assessment against the standards is deemed as essential for those working within the Criminal justice system. The use of ISO standards for organisations and individuals who provide services to the criminal justice system is advocated internationally and advocated in England and Wales by the forensic science regulator. The most appropriate standard for fire scene investigation may be ISO 17020 as opposed to ISO 17025 which deals more readily with fire debris analysis undertaken within the laboratory. Many forensic science providers, including SPSA forensic services are compliant with ISO 17025. The suggestion that a similar requirement, including independent certification and compliance monitoring

should be placed on all participants in criminal fire investigations was discussed. This raises challenges for the fire and rescue service and private sector specifically, should they remain engaged in fire scene investigation within the criminal as opposed to civil arena.

The development of a Scottish national team, supported by smaller regional teams for deployment of level 2 and 3 fires was also discussed. The exact makeup of such a team and the resources required for its support would need extensive further discussion across all parties. The constitution of such a team would be incident specific engaging appropriately qualified and competent specialists if and when required.

3. Programme outputs

a. Background materials and presentations.

All of the PowerPoint presentations produced prior to and during the workshops have been collated and are held by the program organisers. Some of this material is sensitive and cannot be publically distributed. Two briefing papers[4] relating to the challenge of fire investigations (workshop 1) and fire death investigations (workshop 2) were also prepared as briefing notes and have been used in the preparation of this report.

Extensive notes were taken during all of the workshops to capture the discussion and points made.

b. Publications relevant to the programme

The latest version of the National Occupational Standards (NOS) for fire investigation were presented and discussed during workshop 3. Two short amendments were suggested and the attendees have generated the appropriate support for a resolution to be put to Skills for Justice to suggest these minor amendments be considered. This will continue through to 2013.

c. Follow on meetings.

Follow on meetings to address some of the issues and recommendations arising from the workshops have been planed and implemented. The first of these meetings included representation from the private sector, the Scottish crime investigation support officers, SPSA forensic services, Scottish fire and rescue services, CFS-Strathclyde University and the forensic science regulator. The purpose of this meeting was to discuss the definition of a fire investigation standard and how this development may be achieved.

The following specific areas were considered as essential to any developed standard:

[4] Produced by Dr. John DeHaan, Fire Ex, USA

- Determination of origin and cause (including the appropriate use of reconstruction and modelling).
- Understanding of fire development and spread (through appropriate use of fire dynamics, computer modelling, fire intervention strategies, understanding of the natural sciences and reaction of materials to heat).
- Competency of individuals matched to scene requirements (e.g. fatal fire scenes, explosions).
- Development of scene investigation route maps to ensure deployment of the appropriate personnel.
- Effective communication and information sharing between individuals, agencies and the legal system.
- Effective and agreed routes for co-operation between agencies including public and private sector interaction.
- Exploration of a scene triage/pre assessment strategy to clearly identify the appropriate resources required for a given incident.
- Care of evidence (physical, documentary, electronic).
- Evidence recovery strategies.
- Adequate and fit for purpose documentation of actions.
- Appropriate validation of methods and reports through case assessment and peer review.
- Addressing public safety and effective communication to the appropriate agencies for awareness raising and product recall notices.
- Fulfilment of all statutory obligations delivering cost effective investigations to benefit society
- Development of effective and appropriate scientifically founded research

d. Other relevant activities

1. Various discussions are continuing in relation to the development and delivery of CPD courses in different aspects of fire investigation.

2. Discussions are ongoing in relation to the use of computer modeling within the criminal justice system.

3. The application for a Knowledge transfer partnership agreement or similar arrangement between the Centre for Forensic Science and some of the Scottish agencies to develop various aspects of the program are in discussion.

e. Added value of the programme and its potential impact

The work emerging from this programme have been facilitated by the opportunities offered through the SUII research funding. The immediate and critical benefit was in bringing together scientists, police, fire and rescue service, the Scottish crime investigation support officers and specialists from across all aspects of the fire

investigation community from many different backgrounds. Furthermore, having an input from experts from other jurisdictions was particularly welcomed. This was critical in pursuing discussions relating to the development of a fire investigation standards and the ongoing debate in relation to implementing an ISO17020/25 quality framework.

The main objective of the programme was achieved and new working relationships brokered and developed. A common understanding of the fire investigation landscape in Scotland has been acknowledged and the areas of tension exposed and discussed across all parties. The current status of training and standards were discussed and new potential working relationships identified and developed.

Various research issues are being pursued with new collaborators encountered during, or as a result of, the programme. Knowledge transfer partnerships are also being planned.

In terms of potential impact the timing could hardly be more favourable in anticipation of the merging of the Fire and Rescue services and the Police forces in Scotland, each to a single agency. This provides an opportunity to define and structure new inter agency working relationships embedded within the appropriate quality framework depending on the final required output (criminal justice, civil investigations, regulatory, public safety etc.).

4. Conclusions and recommendations

The Programme brought together fire scientists and fire engineers, fire investigators, scientists, police, the Scottish crime investigation support officers, fire service, private sector practitioners, forensic specialists, trainers and policy makers.

Very useful comparisons were made with other jurisdictions and countries which have considered similar issues to those facing Scotland. The future direction of fire investigation in Scotland requires to be decided across a multidisciplinary group being mindful of the various differences between these agencies, in particular, the public and private sector interface.

We conclude that there is a real danger of inadequate investigations being undertaken unless an improvement in the training of the fire officers conducting level 1 investigations occurs. This introduces a risk into the investigative process if such cases enter the criminal justice system.

For the delivery of robust fire investigations for the criminal justice system both organisational and individual competences are essential. Two frameworks are required - one for establishing organisational competence, and one for individual competence, with each organisation being responsible for the competence of its employees. The production and publication of an overarching fire investigation standard would be advantageous in this regard.

The development of a Scotland wide National fire investigation team with smaller regional team support for the investigation of level 2/3 fires and the investigation of fatal fires should be explored further. Associated with this are the trigger points in a particular incident where such a team would be deployed. The exact nature of the deployment, personnel involved and resources required will be incident specific.

We therefore recommend that:

1. A working group be established to draft an overarching fire investigation standard for Scotland, taking into account all of the relevant agencies and being mindful of the interrelationship between the criminal and civil authorities.

2. A similar working group be established to develop a series of investigative route maps which will recommend areas where specific interaction and information sharing should occur across the relevant agencies. This development should lay the foundations for inter agency working protocols and agreements including responsibilities for scene management at different incident types. This would include:

    - A Scottish multiagency agreement and shared working protocols for level 2 and 3 investigations with clear defined route maps for specialist involvement.

    - Defining the appropriate information sharing and scene management protocols across the public and private sector interfaces.

    - Exploring the development of a Scottish National response team supported by regional teams for deployment to level 2/3 fires

3. Defining working protocols for fire investigation within the criminal justice (as distinct from the civil court) arena and in particular the requirements for the demonstration of competence of practitioners (including specialists) working within the criminal justice system.

4. The establishment of a defined training program based around fire investigators who undertake level 1 investigations to include sufficient information to allow them to continue in this role as well as maintain their conduit as a means of providing feedback into the Scottish Government and fire science/fire engineering communities.

5. The Code of practice developed by Andrew Rennison, the UK Forensic Science Regulator, should be considered for adoption in Scotland.

Appendix 1: Programme research questions

Key research questions:

1. How does the fire investigation community currently interact with other stakeholder communities such as fire science and engineering?

2. How can a synergistic relationship between research and development and practice within the fire investigation communities be developed and what would the benefits be?

3. What are the stresses and tensions between practical fire investigation and the more academic or research led areas?

4. How does the changing design of the built environment directly affect practical aspects of fire scene investigation?

5. What are the issues around primacy of the scene and how can these be developed to ensure 'equality of arms' in legal disputes?

6. How can understanding human behaviour in fires aid investigations of fire fatalities?

7. What are the specialists skills required in fatal fire investigation and how can the benefits of these skills be maximized and when should they be brought into the investigation ? How can the relationships between police investigation, fire investigation and scientific investigation be managed particularly where body recovery strategies are concerned ?

8. When are scientific or other related techniques used in fire investigation sufficiently robust to justify statistical analysis and to withstand rigorous cross-examination?

9. How should fire investigation training be developed to be fit for purpose?

10. How should fire investigation be approached on a regional and local level in Scotland?

Appendix 2: Presentations delivered at each workshop

Workshop 1: Fire scene investigation and the development of a multidisciplinary approach.

Presentation	Presenter
Fire investigation - challenges	John DeHaan
Role of the police and forensic scientists	Gary Holcroft
Role of the fire service fire investigators	Dave Somerville
Fire investigation - role of the private expert	John Gow
Using fire engineering and fire science - UK perspective	Jose Torero
Using fire engineering and fire science - US perspective	Jim Quintaire
Importance of electrical evidence at fire scenes	Nick Carey
Fire investigation - reconstruction	Martin Shipp
Computer modelling	Olivier Delemont

Workshop 2: Critical issues in the investigation of fatal fires.

Presentation	Presenter
Fire toxicity	Richard Hull/Anna Stec
Effect of fire on the body	Elayne Pope
Investigating fatal fires - US perspective	John DeHaan
Investigating fatal fires- the police perspective	Gary Thompson
Role of forensic scientists at fatal fire scenes	Steve Andrews
Role of the pathologist	Marie Cassidy
Forensic Entomology	John Manlove
Use of odontology in identification	Phil Marsden
Forensic Anthropology	Sue Black
Forensic Archaeology	John Hunter

Workshop 3: Building better investigative teams : training, knowledge transfer and assessment of competence in fire investigation.

Presentation	Presenter
Fire investigation training -LFB experience	Peter Mansi
Fire investigation standards and training in the US	Dan Heenan
Fire investigation training in Scotland	Kevin Rooney
The role of Skills for Justice - National occupational standards in fire investigation	Charles Welsh
The perspective of the Institute of Fire Engineers	Martin Shipp
Regulations and standards in forensic science in Australia	Alastair Ross
Regulations and standards in Europe and the role of ENFSI	Pawel Rybicki
Regulations and standards in Fire investigation the UK - role of the regulator	Andrew Rennison
Fire investigation in Scotland - what's our future ?	Niamh NicDaeid

Appendix 3: List of participants

Name	Affiliation/Organisation
Niamh NicDaeid	Centre for Forensic Science, University of Strathclyde
Christine Switzer	University of Strathclyde
Wan Mat Desa	Centre for Forensic Science, University of Strathclyde
Ciara Holland	Student, University of Strathclyde
Sue Black	CAHID, University of Dundee
Lucina Hackman	CAHID, University of Dundee
Joseph Topping	Student, University of Dundee
Dougal Drysdale	University of Edinburgh
Jose Torero	University of Edinburgh
Richard Hull	University of Central Lancashire
Anna Stec	University of Central Lancashire
Steve Andrews	University of Central Lancashire
Elayne Pope	Office of the Chief Medical Examiner, Virginia, USA
James Quintiere	University of Maryland, USA
John DeHaan	Fire-ex forensics, USA
Marie Cassidy	Office of the State Pathologist, Ireland
Alasdair Ross	ANZPAA National Institute of Forensic Science, Australia
Dan Heenan	ATF (US Dept. of Justice), USA
Olivier Delamont	University of Lausanne, Ecole des Sciences Criminelles, Switzerland
Pavel Rybicki	Chairman, European Network of Forensic Science Institutes
Andres Rennison	Forensic Science Regulator
Simon Iveson	Forensic Science regulation unit, Home Office
Charles welsh	Skills for justice
Colin Hird	Scottish Government
Adair Lewis	Fire protection Association
David Crowder	Building Research Establishment
Martin Shipp	Building Research Establishment
Peter Mansi	International Association of Arson Investigation
Graham Lannigan	National Policing Improvement Agency
Gary Thompson	Strathclyde Police, operational SIO
Gary Holcroft	SPSA Forensic Services
Ruth Ramage	SPSA Forensic Services
Jane Ballany	SPSA Forensic Services
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Gail McKay	SPSA Forensic Services
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Alison Colley	SPSA Forensic Services
Karen Robertson	SPSA Forensic Services
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Kevin Rooney	Strathclyde Fire & Rescue

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Stuart Peacock	Strathclyde Fire & Rescue
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Gary Love	Strathclyde Fire & Rescue
Stewart Hannah	Strathclyde Fire & Rescue
David Somerville	Fife Fire and Rescue Service
Ross Haggart	Tayside Fire and Rescue
Robert Rearie	Scottish Fire Services College
Jes Eckford	Scottish Fire Services College
Nick Carey	London Fire Brigade
Russell Smith	Hawkins
Chris Wareham	Hawkins
John Holland	Hawkins
David Scaysbrook	Hawkins
Daniel Pointon	Dr J H Burgoyne & Partners LLP
Ron Knak	Dr J H Burgoyne & Partners LLP
Graeme Campbell	Dr J H Burgoyne & Partners LLP
Jim Lygate	International Fire Investigators & Consultants
John Gow	International Fire Investigators & Consultants
John Hunter	Manlove Forensics
John Manlove	Manlove Forensics
Phil Marsden	British Association for Forensic Odontology
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