

## ENFSI FIRE AND EXPLOSION INVESTIGATION WORKING GROUP 1998–2000

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**ABSTRACT:** This paper will introduce the FEIWG of the European Network of Forensic Science Institutes and detail some of its activities from 1998 when the working group was founded. These include the establishment and development of the various sub-committees of the working group and their activities to date. The Working Group has also undertaken various surveys of European fire and explosion investigation facilities within its membership and the results of these will also be reported.

**KEY WORDS:** Fire and explosion investigation; Europe; Update.

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### INTRODUCTION

There is a significant fire and arson problem in Europe costing an average of 28 000 million EUR each year. It is estimated that of all fires which occur in any one year, 10–25% are malicious acts of arson and have been deliberately started. This amounts to an estimated cost of 7000 million EUR directly due to the criminal action of arsonists and over 2000 deaths. The crime of arson is difficult to investigate with many different individuals and agencies involved in any one incident each with their own procedures and approach. Without a standardised approach to the investigation (facilitated by appropriate guidelines and training) it is sometimes difficult to carry out effective investigations and perhaps as a consequence the number of arson cases which are solved are as low as 10–18%. It is also known that the number of arson and deliberately started fires in different European countries are on the increase while detection rates and clearance rates are decreasing in some countries.

There is a need for the development of a European wide approach to tackle this issue. This need arises because there is little or no European standardisation, harmonisation or best practice guidance in fire scene investigation, or in associated activities (training, quality assurance, laboratory investigations and others). Secondly, there are no European wide sta-

tistical databases or reference collections in the area of fire investigation. Finally, there is currently no means for formal dissemination of data in relation to fire research or any means to encourage European collaboration in the development of appropriate research methodologies specific to the arson problem. It is recognised that as Europe moves increasingly in the direction of a more harmonised and synergistic continent, co-operation will be necessary across national boundaries in all areas relating to crime.

At the first European Academy of Forensic Science meeting held in Lausanne in 1998 it was decided to explore the possibility of establishing a ENFSI working group in the area of fire and explosion investigation. After an inaugural meeting in Lyon the following year the Fire and Explosion Investigation Working Group (FEIWG) was formally constituted. The working group currently consists of representatives of ENFSI institutes from 19 European countries, as well as invited members and has links with similar organisations in the USA and Australia. The FEIWG has set the following goals and objectives and has established 6 sub committees to further the achievement of these goals:

- promote harmonisation and co-operation;
- generation of best practice guidelines for the scene & lab;
- education and training for the scene & lab;
- research;
- quality assurance, proficiency testing and accreditation.

## FIRE AND EXPLOSION INVESTIGATION IN EUROPE

Initially a number of surveys were carried out amongst the various ENFSI organisations involved in the working group. This gave an up to date picture of the current situation in fire and explosion investigation across Europe.

### **Case loads**

The majority of personnel involved in fire and explosion investigation are involved in either the examination of the scene or the examination of the scene and the laboratory examination of evidence (68%). 62% of these laboratories undertake an average of greater than 12 laboratory investigations per month and 25% of laboratories attend on average 12 scenes per month.

### **Training and education levels**

Across Europe greater than 70% of fire and explosion scene investigations are carried out by the police. In many cases, although the officers may

have undertaken courses during their training in such examinations the majority have no formal scientific educational backgrounds. In most countries, police and fire brigade personnel are the first responders to scenes. Of the working group members who carry out scene investigations, personnel have at least undergraduate qualifications and it was found that non-police fire and explosion scene investigators tend to have at least undergraduate science qualifications.

24% of institutes have written training programs for scene and/or laboratory investigations while 40% of institutes document training of new personnel. Training periods take on average 15 mths for laboratory investigations and 19 mths for scene investigations. Trainees work on average 155 cases for laboratory investigation and 58 cases for scene investigation before deemed qualified.

### Methods and technology

The types of containers used for the collection of fire/explosion debris through out Europe vary widely. Figure 1 illustrates this. The most popular types of containers are glass jars (31%), Nylon bags (26%) and polyethylene bags (17%).

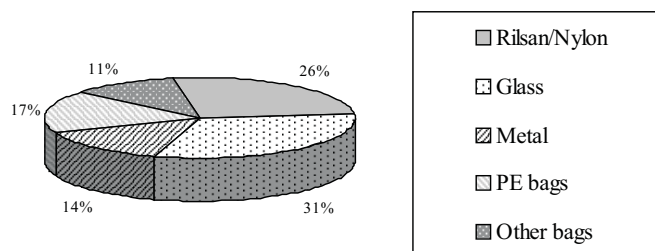


Fig. 1. Types of containers used in recovering debris.

Depending on the nature of the debris to be analysed various methods of extraction are employed. These include direct injection (for liquid samples), solvent extraction, direct, passive and dynamic headspace extraction, solid phase micro extraction (SPME) and in some cases steam distillation.

The instrumentation of choice for analysis is GC/FID and this is used by 83% of laboratories either on its own or in combination with GC/MS.

In all laboratories the results of analysis are compared with reference databases held in the laboratory or documented examples. 56% of laboratories use computerised sample comparison systems.

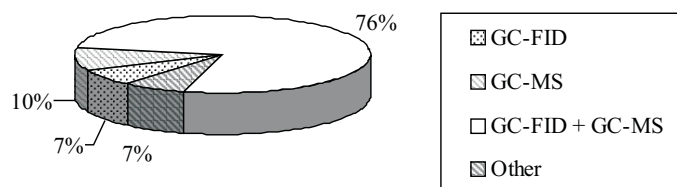


Fig. 2. Analytical techniques.

### CONCLUSIONS AND THE FUTURE

The surveys carried out to date by the FEIWG have identified various areas within the fire and explosion investigation field where it would be valuable to produce guidelines and to engage in research.

Specifically the working group will engage in research in the area of packaging materials and accelerant databases. There are also plans to undertake live burn experiments from which analytical data can be obtained. Work is continuing in the area of quality assurance and a draft guideline on "Quality Assurance for the Chemical Analysis in Fire and Explosion Investigations" [1] has been produced. The development of basic first responder guidelines is also being undertaken. Other areas of interest to the working group are health and safety at the scene and in the laboratory, the investigation of explosion scenes and debris and computer modelling of fire and explosion scenes.

#### References:

1. Hordijk, M., Viitala, N., Quality assurance for the chemical analysis in fire and explosion investigations, draft version, August 2000.