

Briefing Note 4 - Fire Investigation

Fires are investigated by a wide range of people for a diverse range of objectives. An investigator appointed by an insurance company may wish to determine the cause to establish liabilities. The Fire Brigade investigator will be concerned with determining the “defect, act or omission” which led to the fire to improve fire prevention. The forensic scientist will be attempting to determine whether or not a criminal act has taken place and, if so, what evidence can be recovered from the scene to link to an offender or assist in the police inquiry. On many occasions it may be appropriate for these parties to carry out a joint examination.

Regardless of these objectives, all the investigators will be interested in determining two principle things. Firstly, the origin (or seat) of the fire must be determined and secondly a consideration of what may have started it, i.e. the “where” and “how”. It is vital to determine the origin and cause in that order. The more imprecise is the origin then the more potential causes may have to be considered.

All fires are essentially a chemical reaction; a fuel and a source of heat combining in oxygen (air). The fire then spreads by a number of mechanism including radiation, convection and conduction. An understanding of these fundamental mechanisms is essential to correctly identify the origin of the fire and not be misled by false indications. For example a fire in a typical domestic lounge will spread across the ceiling and may ignite the tops of the curtains. If these then fall to the floor, the casual observer might mistakenly infer a second seat of fire.

Several complimentary methods are used to determine the origin of the fire. As a general rule fires will tend to spread upwards and outwards. A good place to start, therefore, is by finding the lowest area of severe damage. Heat and flames are quite directional and will leave patterns of charring in some places and protected areas in others. All of these will assist in determining the origin of the fire.

The cautious evaluation of eye witness evidence, photographs and videos may also assist in determining the origin of the fire.

Having established, with reasonable accuracy, the origin of the fire it is then necessary to consider the potential causes. It will frequently be necessary to excavate and reconstruct the fire scene (rather like an archaeological dig) to obtain a clear picture of the scene

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before the fire. The presence of electrical or heating items needs to be established and may require further laboratory examination and testing for appliance malfunction or misuse. Consideration would also be given to the possible involvement of a discarded lit cigarette or a naked flame; such as from a match, lighter or candle. The presence of a severe yet localised pattern of damage may be indicative of a smouldering fire, such as initiated by a lit cigarette. A smouldering fire can, however, can transform into a flaming fire and likewise a flaming fire can die down to smoulder. All of which can complicate the overall interpretation of the damage.

There are some typical indications of a deliberate fire; multiple points of ignition, the use of a flammable liquid, modified fuel load (e.g. the armchairs stacked on top of the sofa!) the presence of an incendiary device or timing mechanism. A deliberate act may also be inferred by indirect forensic evidence. The presence of a broken window at a point of entry, footwear or tool marks, a drop of blood or snagged fibres could all indicate a suspicious event.

This is why, in our view, it is important to remember that the scene should be treated as a crime scene not just a fire scene and the investigator must have a thorough awareness of a wide range of forensic techniques.

Endangering life

To determine the potential of a fire to spread and endanger life it is necessary to consider many factors; the availability of the fuel to propagate the fire, the presence of automatic fire detection and suppression systems, the construction and materials used in the fabric of the building and the use of specific fire retarding materials or devices.

Fire Brigade

Until recently there has been no statutory authority for the fire brigade to investigate fires. They were, however, requested by the Home Office to provide information on fires for statistical purposes. The Fire and Rescue Services Act 2004 came into force in October 2004 and provides the fire authorities with certain powers for the purpose of the investigation.

For most fires investigated by the Fire Brigade a short proforma questionnaire is completed, such as an FDR 1, for use by the Home Office in collecting statistical information. Section 5 of the report details the "Most likely Cause" of the fire. This report often forms the only contemporaneous notes of the fire brigade investigation. Unless the fire is remitted to the police for further action it is often the only source of information regarding any investigation of the fire.

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Fire Service Circular 1-2006 “The Investigation of Fires where the Supposed Cause is not Accidental”, produces guidance on the roles and responsibilities of the police and fire brigade in the investigation of fires.

(www.communities.gov.uk/documents/fire/pdf/143648.pdf),

It suggests that

“It is a matter for the Courts to determine whether fire or police officers should be regarded as “expert witnesses” but it is clearly unrealistic to proceed on the basis that the routine training courses in fire investigation for fire or police officers can provide a level of qualified scientific expertise equal to that possessed by a forensic scientist”.

Ultimately, it will be the decision of the trial judge as to whom the court defines as an expert witness. In R v Enda Doyle (CCC 1995) the trial judge accepted fire brigade evidence as to the cause of the fire. Where Fire Brigade is adduced it should follow the guidelines given by the CPS “Disclosure: Experts Evidence and Unused Material” Guidance Booklet for Experts to retain, record and reveal the results of any examination. (www.cps.gov.uk/legal/d_to_g/disclosure_manual/annex_k_disclosure_manual/)

In particular the advice states:

“The notes should be sufficiently detailed and expressed in such a manner that another expert, in your field, can follow the nature of the work undertaken, any assumptions made and the inferences you have drawn from the work”

And also

“Your notes, in whatever form, should also be structured in a manner that facilitates review. Any updates, alterations or comments should be clear. It is important that your notes are clear and comprehensive. This will allow another person who may subsequently review them to have a full understanding of the position at any given time.”