

FIREPOINT



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Firepoint

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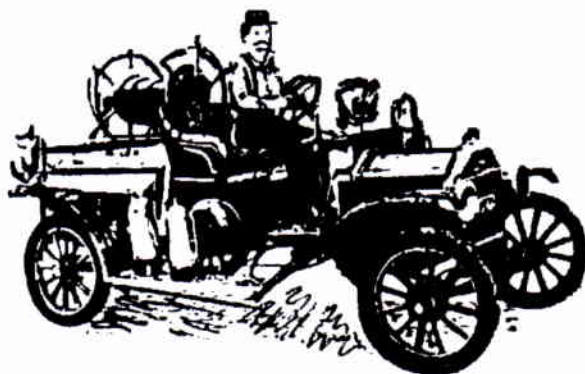
FIREPOINT: IF YOU HAVEN'T PAID YOUR FEES FOR THE CURRENT YEAR, PLEASE DO SO NOW.

EDITORIAL

Congratulations to the Organizing Committee of the National Educational Conference offered in Sydney in August. The conference ran smoothly, covered a wide range of relevant topics, and attracted participants from all states and from New Zealand.

A special thanks to Conference Convenor, Mark Black, and MC Andrew Kerr for their active participation. At the NSW AFI AGM held during this Conference Mark Black was elected President. Congratulations mark, and thanks greg Kelly for the work you put into the position for the previous two years.

Wal Stern



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Victorian Association of Fire Investigators Inc.

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NATIONAL CONFERENCE

Although the 2010 National Conference will be all over by the time this is published the VAFI Committee have spent many hours discussing and supporting this event. I believe that there will be quite a few coming from Victoria to the Conference. Of course this will hopefully give us the edge for the next National Conference to be held in Melbourne in 2012.

VAFI MEMBERSHIP

Renewals for membership should have been received by all members, and fees are due by 31 August 2010. At the end of this year there were 211 financial members comprising: MFB 46, CFA 79, VICPOL 33, ESV 5, Private Investigators 10, Private Industry 18, and Other Govt Depts 20.

This shows the spread and variety of members we have in Victoria. Members will need to be financial for the AGM in October. Welcome to the following new members - Grant Boyle DSE, Craig Britton CFA, Jeff Wilke DSE, Chris Jacobsen CFA, Anthony Morris CFA, Ray Argento CFA and Debra Prior ANPA Services.

VAFI SCHOLARSHIP

The VAFI Scholarship for 2010/2011 has now closed. Unfortunately the Committee had no applicants for the Scholarship and it will now lapse till next year. The Committee is disappointed that no member applied for the \$1,000.00 scholarship, but would remind that all financial members of VAFI are eligible to apply for this scholarship with now the closing date of 30 June 2011 for the period of 2011/2012. Further information can be obtained from the website.

TRIPLE TREAT TRAINING SESSION

On 3rd of June 2010 the Committee invited 3 speakers to give presentations on their selected subject. Firstly was Trevor Pillinger with his presentation on Vehicle Fire Training in Dubai. Trevor and Russell Lee travelled to Dubai to conduct training on vehicle fires to manufacturers and fire service members. Although the training was similar the facilities, new cars to burn and the variety of modified cars was something different.

(Why would you modify a car and buy it for a ridiculous amount – because they can) .

The next speaker was George Xydias VICPOL Forensic Services who spoke in detail of homicide fire scene examinations and the processes and procedures.

The last speaker was SO Dave Thompson reviewing the current situation with insulation fires. Of course everyone would know about the insulation scheme where an estimated 260,000 homes were insulated. Problems arose from bare minimum of training, contracting of unskilled labour, no risk assessment and unethical operators.

The key problems that have been identified are clearance of downlights and exhaust fans, inadequate guards fitted, retardant properties reduced, no advice for home owners and incorrect laying and overlaying and mismatch of insulation types. In Victoria roof/ceiling type fires have spiked in the late 2009/2010 over the past 4 years and this has been reported up to Canberra.

The committee thank all the presentors and the 55 members who attended this very informative and sometimes light hearted training session.

TRAINING PROGRAM 2010

National Conference (Sydney)
15 – 17 Aug 2010

Case Study & Fire Modelling
26 August 2010
Jarrod Edwards MFB

Fire Modelling
Operation Lithos
DSC Scott Barnes
& Dannielle O'Keefe

Wildfire Presentation and VAFI AGM
23 October 2010
Presentations from Fabian Crowe,
Mark Gilmore and Les Vearing on
Wildfire Cause and Origin in detail.

Multi Agency Wildfire Ops
Chris Murray AES VICPOL

DVI presentation
ESV Electricity and Wildfires

NSW AFI COMMITTEE

At the NSW AFI AGM held on 17th
August 2010 the following positions
were filled:

President: Mark Black

Snr Vice President: Barry Sutherland

Jnr Vice President: Barry Tindall

Secretary : Steve Apps

Treasurer: Taylor Palliton

Committee: Morgan Cook
Michael Forbes
Melissa Salmon
Jeff Sinton

Past President: Greg Kelly

THE INVESTIGATION OF DEATH BY FIRE

Ross Brogan AFSM, MA, CFI/IAAI

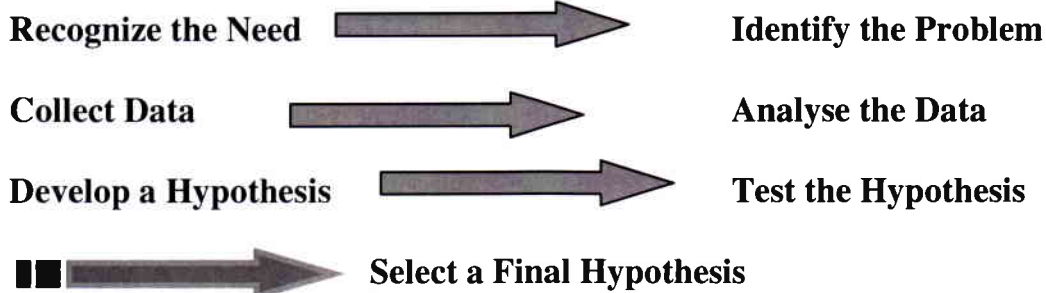
When called upon to investigate a fatal fire, the chances of successfully reaching a conclusion on the cause and origin of fire are enhanced. The body of a victim in a fire scene adds considerable evidence, which would not normally be available. This evidence should be viewed, and considered, carefully. The procedure must be thorough since it follows that at some later date, an inquiry will be held into the death.

This extra evidence presents the possibility of added hazards. There is a need for vigilance when inspecting the scene, for the sake of the extra evidence available. There is a need for personal protection from the presence of blood and body fluids containing disease and/or contaminating biological matter. Do not underestimate the scene and take all necessary precautions to obtain necessary evidence and maintain your own safety.

FIRE CAUSE AND DETERMINATION

It is important to follow your normal procedures in determining fire cause and origin, maintaining an open mind on the origin of the fire. Approach the fatal fire investigation in the same manner. Increasingly we are seeing the expertise of Fire Investigators called upon by the Coroner and the courts in determining not only the fire cause and origin, but the cause of death related to that fire. We have an obligation to find the cause of the fire, for many reasons, but mostly (in the case of death) to attempt to prevent the same type of fire from causing another death. The most valuable tool in the investigation of a fatal fire is a high index of suspicion and unlimited curiosity in the mind of the investigator.

The Systematic Approach – The Scientific Method



SCENE PRESERVATION

At any fire or incident, especially those considered being suspicious in nature, or resulting in serious injury or death, every effort is to be made to preserve

and secure the scene to enable forensic evidence to be collected, uncontaminated.

The scene

The management of the scene of a disaster will follow general crime scene procedures. Correct crime scene procedures must be adopted prior to the removal and identification of bodies and human remains. The scene must be thoroughly recorded and examined. At a large disaster scene, DVI and the incident investigation may be two distinct roles undertaken by separate crime scene teams. However, both functions will require coordination and liaison.

Identity

The first task that may face the investigator is to ascertain whether the remains are human or animal. At times it can be difficult, due to the severity of the fire, to even locate a victim. Usually the torso remains in some form and if in doubt as to whether human or animal then it should be treated as human until the investigation shows otherwise.

Identification of the body can be difficult at times due to destruction of facial features and general damage to the body. The recovery of clothing and personal effects such as jewellery, keys, rings etc. from the body is not conclusive as to the identity of the victim. Final confirmation of the identity may be confined by comparison of the body with known characteristics of possible victims.

Such comparison would include:

- sex of the body
- fingerprints
- dental features
- skeletal features
- blood grouping
- post mortem examination can reveal sex, previous injuries or operations, congenital defects which can be

compared to medical and dental records.

Victim injuries

The investigator should carefully note and document the position and condition of any fire victims and their relationship to other objects or victims; including injuries they may have sustained. Post mortem reports and medical records may provide useful information regarding burn damage, and injuries.

Burn injuries

The manner and extent of burn injuries may provide clues to the origin, cause, or spread of the fire. Burn injuries may be sustained while setting an incendiary fire. The investigator should ascertain whether the fire victim's burns and the nature of the injuries are consistent with the investigative hypothesis regarding fire cause and spread. The investigator should check the local hospitals for the identification of any persons admitted or treated for burns.

Hot smoke and Gases

It is important to remember that the temperature of the smoke products of many combustible materials in common use can be measured in hundreds of degrees Celsius. The effect on a person being enveloped in such heat is such as to cause immediate disorientation and tissue damage with unconsciousness and death following rapidly. The probability is that in many such cases, the asphyxiant or toxic gas will not have time to react before the person is dead, from the heat and smoke effect.

It is important to note that when relating the subsequent *Carboxyhaemoglobin (COHb)* levels found on analysis that the figure is

compared with the following factors relating to the scene of the incident.

- speed of the fire development and materials
- probable speed with which the victim[s] was enveloped by smoke or subject to direct flame or radiated heat.
- Air supply available into the compartment and ventilation out.

Toxic effects: Carbon Monoxide (CO) combined with the *haemoglobin* [chief oxygen carrying substance in the blood] creates *COHb* and thus mainly acts as an asphyxiant, since it

prevents oxygen being carried to the tissues. NOTE - a level in the body of 60% CO is considered fatal, however in fire deaths this level is reduced to 50%. While it is not possible to assess exactly the levels of *COHb* that might be expected in victims since these can be variable even for persons dying in the same compartment, it may be possible for experienced investigators to utilise such findings in their overall assessment of the suspected cause. In the case of heavy smokers they may have a virtual constant level of *COHb* of 10%. Medical histories may assist in this regard.

<i>% CO in blood</i>	<i>Effect</i>
0-10	Slight loss of mental acuity.
10-20	Slight headache, dilation of skin vessels.
20-30	Severe headache, throbbing.
30-40	Severe headache, weakness, dizziness, confusion, nausea, vomiting, collapse.
40-50	Fainting, rapid heartbeat, collapse, death in some individuals.
50-60	Fainting, rapid breathing, possible coma, convulsions, respiratory irregularity.
60-70	Convulsions, depressed heart action, death.
70-80 (higher)	Weak pulse, respiratory failure, death.

(DeHaan, 2007 –Table 15.3. pg. 587)

DOCUMENTATION OF FIRE SCENE

NFPA 921 A Guide for Fire and Explosion Investigations (2008) introduces the investigator to the topic of documenting the fire scene –

In recording any fire or explosion scene, the investigators' goal is to record the scene through a medium

that will allow the investigator to recall his or her observations at a later date

and to document the conditions at the scene. Common methods of accomplishing this goal include the use of photographs, videotapes, diagrams, maps, overlays, tape recordings and notes.

“Thorough and accurate recording of the scene is critical because it is from this compilation of factual data that investigative opinions and conclusions will be supported and verified”.
(15.1.2)

Note taking

Notes should be complementary to photography, diagrams and sketches and should be used to record those items, ideas and observations that can not be photographed or drawn. These will include:

- a. Names & addresses
- b. Model & serial numbers
- c. Statements
- d. Log of photos (including direction, from-to)
- e. Identification of items
- f. Types of materials comprising linings, fixtures, contents, foamed plastics, carpets, etc.
- g. Full description of the position of the body and unusual factors observed; if any.

Notes should be fully comprehensive and thoroughly cover all areas inspected and items observed. These can be in point form, or longhand, to fully describe the scene. Be thorough and include observations made regarding unusual behaviour of the fire or the victim which may assist you to

form a theory or opinion about the behaviour or cause of the fire.

REPORTS AND STATEMENTS

Reports and statements relating to fatal fires should reflect the amount of time and effort expended in the investigation process. A full and comprehensive account of detailed inspections and observations should be submitted; showing reasons for the determination of fire cause and origin. If an opinion is offered, reasons should be given to substantiate how that opinion was reached. Any research carried out, or literature consulted, should be both quoted, and copies attached, for the sake of clarity and professionalism.

If, after completion of your investigation, matters of concern, or questions exist, include these within your statement to bring them to the attention of the Coroner, Police or your Supervisor. Don't be afraid to consult with investigating Police or Coronial investigative staff if matters cause you concern, that your research can't address. The most important part to remember is, that, **"if something is unusual, someone must investigate it."**

Reference List:

Charles Sturt University. (2010). *Fire Investigation Training Manual*. CSU, Australia.

DeHaan. J.D. (2007). *Kirk's Fire Investigation*; Sixth Edition. Prentice Hall. USA.

NFPA. (2008). *NFPA 921 Guide for Fire and Explosion Investigation*. National Fire Protection Association. USA.

Fire Investigation – Changes to the Australian and New Zealand Wiring Rules, Deliberate and Accidental Findings

The following information surrounds the considerations which should be undertaken by Investigators and Fire Scene Examiners in relation to fire causation, and in particular changes which have occurred to the Australian and New Zealand Wiring Rules identified by the Standard AS/NZS3000:2007.

Fire examination generally leads to the determination that the fire has been either deliberate, accidental in causation or is undetermined. If we first look at accidental, other than informing the Coroner and general safety concerns with the accidental causation of fire, accidental fires may have many ongoing ramifications in civil proceedings that require thorough examination and investigation. Nominating a cause without proper and thorough consideration can and has led to litigation that can be expensive and may be often unnecessary. The identification of faulty appliances, poor workmanship or fault conditions can also lead to litigation where the investigator can be called to give evidence of their findings.

I am of the opinion that just as much thought and testing of any hypothesis in accidental determination should be given before any final determination is made. It could be suggested that in the examination of an accidental fire, once that determination is made, the detail is fairly straight forward. The truth of the matter however is that each of the considerations should be tested against what evidence exists. If the hypothesis is considered, what should be the evidence

that was considered against other potential failures or ignition systems available in the area. You may recall if present at this presentation that I outlined an accidental fire where it was believed that an oscillating fan had failed, leading to the fires development. Further examination however led to the identification that in the short period prior to the fires development, a bag of towels had been delivered just after drying at a Laundromat back to the premises. When the cupboard structures were actually placed back together and reassembled, burn patterns were identified developing from the floor up where the bag had been placed prior to the store being closed. That accidental cause led to a recovery action being undertaken by the insurers.

Electrical Faults as Findings

If the investigator sees an appliance or electrical system has caused a fire, the physical evidence needs to be well established to back that up. Testing that hypothesis is a necessary part of any determination. Excavation of the scene in any findings is nearly always necessary both to establish and eliminate evidence. Guessing is not good enough at any time even if the investigator believes there may be some evidence to show that occurred. Unless the cause can be attributed directly to that failure or operation then it is my belief it might more appropriately be deemed undetermined.

What's happening with Litigation?

Simon Theodore and Jamie Richard of Gadens Lawyers, Sydney, Australia have outlined what's happening with litigation funding in Australia. They indicate that litigation funding is the contribution to the costs of litigation by non parties. Through litigation funding, legal costs and disbursements for the litigant are paid by the funder and any adverse cost orders are also met by the funder in return for the percentage of any settlement monies usually in the vicinity of 25 – 45 percent. Funding is generally available to parties in litigation who have a prospect of recovery. Should the plaintiff be unsuccessful, the funder receives nothing and must bare both the plaintiff's costs as well as any costs orders made against the plaintiff. As a result, we now see that parties who are not part of litigation where a law firm may believe that they have a good case will be funded by the third party with potential return in the order of 25 – 45 percent of the settlement amount. This could be seen as non interested parties basically investing in litigated matters.

Accidental Electrical Causes, a Case Study in Potential Litigation

It is often the case that an uninsured tenant will expect the landlords insurance to pay out for the tenant's damage in a fire. A scene was examined at Potts Point in the eastern suburbs of Sydney where the fire had been determined as accidental and originating from "a power point". It was reported to the fire brigade officers who attended, that the tenant in the premises had complained approximately one week prior to the fire that she was having trouble with the power points and that

the fuse kept blowing. A claim was placed with the building insurer for the damage to the unit. Once the scene was examined, several notable facts came to light. The scene itself was quite unusual in that a double bed mattress had been placed across a blanket box and supported on a kitchen chair extending back to a corner section of a corner lounge suite. Amongst the items within the premises were a large vertical CD rack and entertainment unit located adjacent the bedding area. Other more decorative products in the room included several bongos and a sharps container on the floor from which numerous used syringes were sticking out. These types of observations in a very blackened room, should alert the examiner to potential safety issues for themselves.

Due to the fact that the tenant was uninsured, she indicated that she intended suing the owner, therefore expecting the building insurer's policy to respond. Enquires had already been started due to the fact that the fire had been put down to an electrical fault developing from a GPO on the internal living room wall. Initial information indicated she had applied or was applying for a copy of the fire brigades report to further weight her argument that even the Fire Brigade had indicated that the fire had developed from the GPO failing which was further evidence of her initial complaint approximately one week prior to the blaze.

Upon further examination, it was noted that the fire developed from one specific area in the living room of the home which was also the area where the bed had been set up. Some of the furniture had been moved around, although based on the fact that the fire was considered to

be accidental, with fire developing directly from behind the entertainment unit, the fire had risen to the ceiling and the area of origin was easily identifiable. It was however during further examination that only one GPO was noted in the area. Multiple items were observed within the small makeshift entertainment unit including a DVD player, TV and other items that therefore needed a power supply. Upon further inspection, the GPO was found to have a protection pattern indicative of a plug being in one side of the GPO with a 'V' pattern rising into the faceplate of the GPO. The other outlet was melted on the face. The floor area was then excavated to reveal the remains of a four outlet power board. That further excavation led to the discovery of the remains of conductors associated with an extension cord. By following the extension cord right across the room where it was routed across the floor, another six outlet power board was found with the extension cord plugged into it. That six outlet board was plugged into a GPO on the other side of the room. Burn patterns were further examined to reveal the carpet and underfelt around the power board remains had been totally consumed in the fire development. This was the deepest area of burning and it appeared that fire spread away from the carpet and the remains of the power board at that point. Fire also developed across the various combustibles before it then rose up through the face of the GPO that was originally considered the cause of the fire. During this examination, many of the electrical appliances, particularly those on top of a small bar refrigeration unit were examined to reveal their electrical ratings where the electrical loading of each of the appliances was considered. Amongst the

various items were a kettle, toaster and other appliances.

An examination of the electrical load centre, identified in a cupboard in the kitchen, identified rupture marks from rewirable fuses in both of the power circuits.

In considering the wiring rules which existed when the installation was done, electrical contractors at that time were forced to put two power circuits in place. The reasoning behind two power circuits being in place was that they were limited to the number of GPOs that could be connected to one power circuit in a residential situation. If an electrician put in one power circuit in those days, then they were not allowed to put anymore than four GPOs on the circuit. A double GPO counted as two. If the electrical contractor put in more than one power circuit, then each of those circuits was allowed to have 15 GPOs on each circuit. It is obvious therefore that the authorities placed that standard, in order to force electrical contractors to put more than one power circuit into a residential establishment so that the load from the GPOs could be spread between at least two circuits. Double GPO's were later counted for these purposes as one.

We now come back to the original complaint by the tenants to the landlord. She had complained that the fuse was blowing and that there was a fault with the system. Upon further examination all of these various appliances she now had plugged in via a multitude of multiple outlet power boards with the electrical ratings on the various appliances indicating that if these items were simultaneously used or even a combination of them used, they would

overload the circuit causing the fuse to blow. The examination of the GPO in the area of origin revealed that the fire damage rising through the face of the GPO was indicative of the fire spread to that area. During the examination the GPO was removed from the wall and inspected. The wiring behind it was in pristine condition.

There are three parts to the final section of this story. Part 1 was that the tenant and her partner returned to the premises whilst the examination was being conducted and collected a number of syringes as well as bongs to go to the roof of the premises where they were to be involved in some social activities. Part 2 is that the electrical complaint did not lead to any litigation against the building insurer due to the findings. The final section of this story was that the local police were also called to the establishment and subsequently arrested the tenant and her partner for the use and supply of drugs.

Spoliation

We seem to be more involved in civil litigation these days. I am of the opinion that spoliation of evidence will be highlighted as a concern. Spoliation of evidence is the intentional or negligent withholding, hiding, alteration or destruction of evidence relevant to a legal proceeding. With that basic understanding, the concerns in relation to accidental fire causation determinations involving appliances or other mechanisms where that determination has been made will become more critical. It is therefore important for us to consider all of the facts and be careful that we are not destroying evidence, particularly in the

area of accidental causation where litigation could occur. We must as best as possible try and maintain the integrity of the evidence so that any party involved has the opportunity to examine it and consider the determinations.

AS/NZS Wiring Rules 3000:2007

The abovementioned publication is the electrical standard for electrical installations in Australia and New Zealand. This new edition was published on 12 November 2007 and became mandatory for electrical installations from 1 June 2008. The changes were made to address industry needs and provide more scope to address safety outcomes rather than prescriptive practices. In summary, that basically means that there is more scope for electrical contractors and engineers to look towards meeting safety outcomes rather than the Standard setting out how a job will be done, which in practice can create a number of problems. The onus therefore has been placed back on those designers and installers to meet the safety outcome to satisfy the Standard.

In order to achieve the aforementioned outcomes, the Standard was divided into two parts. Part 1 is titled Safety Principles and provides the safety regulatory platform and alternative means of installation. With regard to electrical installations, scene examiners and investigators need to be conscious of the regulatory requirements in relation to the meeting of the Standard. As a result, there are several dates that are important in our considerations of when electrical work was undertaken and which Standard needed to be met. Work commenced after the published date of 12 November 2007 and completed

before 1 June 2008 can comply with either the new or previous wiring rules standards. Work commenced after 12 November 2007 and completed after 1 June 2008 has to comply with the 2007 edition. There is provision for work designed and tendered or commenced before 12 November 2007 but not completed may comply with the 2000 edition on the provision of proof, in relation to that installation and tendering.

Part two titled Wiring Practices provides the installation practices for all normal applications.

1.9 Compliance

Compliance with the wiring rules is then outlined under section 1.9. Compliance is to be achieved by

- Complying with Part 2, wiring practices
- Complying with other standards
- Using Part 1 to justify the alternative installation and section of equipment.

Part one provides the safety objectives against which the failure or alternative Part 2 condition can be assessed and found acceptable. What this means is that Part 1 outlines what is to be achieved from the safety considerations in the installation. In summary it means that electrical contractors need to meet the safety objectives that are set out in the first section and they can use the first sections safety objectives to be able to justify the failure to meet the prescriptive installation methods set out in part two or why they have installed an alternative to those set out in part two. In regard to these matters, the onus is on the installers to prove the work is safe,

but there is also an onus on regulators to prove that it is unsafe in the event of something occurring.

Complying using Part One of the Standard

Section 1.9.4 states that the onus is on the designer/ installer to justify and document significant departures from the installation. What this means is that if an electrical contractor is going to depart significantly from the prescriptive methods in section two, then they need to (1), justify it, and (2), document those departures and at the same time, there must be an acceptance by the customer that those alternatives have been explained to them and the customer must note it.

Part Two, Wiring Practices

In this section, the new wiring rules under section 2.6.3.1 indicate that residual current devices (RCD) in domestic/ residential installations are required on all circuits for socket outlets, (therefore all GPOs), all circuits for lighting and also that it includes all common areas of the home units. The requirement therefore that RCD's are to be used for GPOs and lighting raises the question, as it has for some time, regarding the use and consideration of what has previously been termed arc mapping in fire examination. Residual Current Devices in normal domestic premises are rated at 30 milliamps which is at a level which causes electricity to be disconnected prior to a person's heart going into fibrillation. Other Standards such as medical installations require more sensitive RCD's that trip at 10 milliamps. The sensitivity of these units therefore indicates that there may not be

any indication of a short circuit or arc where the subcircuit is protected by a residual current device. There are some circuits however that an electrical contractor may install that are not protected by a residual current device which may subsequently be affected by the fire development and short. It is therefore my opinion that the use of arc mapping in fire examination has been basically reduced to a worthless exercise. It certainly can not be relied upon in order to identify an area of origin where in particular, residual current devices exist. Arc marks can simply indicate the circuit was energised.

In Part 2 titled Wiring Practices, there are a number of changes to the installation rules with a new general clause involved to minimise the spread of fire. There have been changes outlined under section 4.5.2.3 under Recessed Downlights. Most fire examiners around Australia certainly the emergency services and more particularly fire brigades would be aware of the fire risk the heightened problem with ceiling fires following the installation of insulation. The Standards have identified the high fire risk from halogen and incandescent downlights. We must be careful however in the examination not to include fluorescent downlights or what is often referred to as compact fluorescents. The clearance distances from combustible materials have been increased as well as the considerations of thermal insulation installation. There are acceptable methods outlined which include specifically designed downlights which will stop any contamination with the reflector or other area of the downlight which produces heat and could lead to

ignition. A fire resistant enclosure or barrier can also be used or in the absence of those items, the fault clearances as set out in figure 4.7 can be utilised. I have included a copy of figure 4.7 for reference.

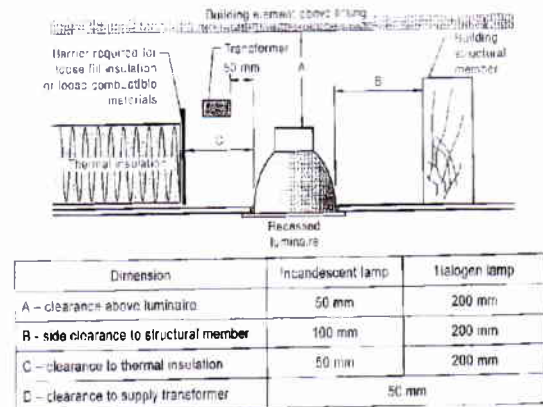


FIGURE 4.7 DEFAULT MINIMUM CLEARANCES FOR RECESSED LUMINAIRES

Documentation

If an electrical contractor or designer departs from the prescriptive installation processes in Part Two of the Standard, then the designer is required under section 1.9.4.3 to document the Part One design. In other words, as we have explained, the documentation will include how it meets the safety requirements of Part One with the section also requiring that the documentation should indicate why Part Two of the standard was not adopted and that the verification requirements that are required to be undertaken to ensure the full compliance of the Standard are met. These documents shall be in the English language. They are also required to detail how compliance with Part One of the Standard is being achieved and that the owner or operators acknowledgement to any departure from Part Two of the standard has been obtained. If the design requires specific installation use by the owner or operator

of the electrical installation, a copy of the requirements is to be given to the owner or the operator. The verification undertaken to ensure full compliance with the Standard and the results of the verification will also be documented. If conducting factual enquiries, the documentation shall be retained by the designer and also on site at the electrical installation by the person with the overall responsibility for the installation. During enquiries following a fire therefore, documents that should have been completed in relation to the compliance with the standard should be available with a copy being left at the installation and a further copy being available from the designer or installer.

Further Considerations

There are a number of other considerations in relation to the electrical standards and fire examination given that there is now the section 3.9.9 that has been included to minimise the spread of fire. Section 4.5.2.1 titled General, indicates that lamps, luminaires and their associated ancillary gear (which would include transformer) shall be so installed as to not cause undue temperature rise, ignition or deterioration of the materials a) on which they are mounted or b) that they illuminate. There are other subsections within that area which outline the requirements in regards to lamps near flammable materials. There is also a table which indicates the minimum distance set out in the standard between lamps and flammable materials with that table showing that a lamp with an output equal to or less than 100 watts, then the minimum distance required is .6 of a meter. Greater than 100 watts and less than or equal to 300 watts, a minimum distance of one meter is

required with lamps having a rating of over 300 watts it is required to be at least 1.8 meters away from any flammable material. I have already indicated that there are increased distances between recessed luminaires or downlights from combustible material. Rather than go into detail here, the distance is probably best considered by looking at the diagram itself and looking and considering the barriers called for and distances for combustible material. Of note, scene examiners should look at the distances between the outside of the reflector of the light fitting and the distance from the outside of the reflector to the combustible material.

I trust that the information contained above will give you a general overview of some of the changes to the wiring rules and will assist in the considerations around potential electrical ignition sources that are associated with electrical installations and the consideration of which of the wiring rules publications needs to be considered in relation to the period that the electrical work was actually conducted.

The Author

Greg Kelly is the Principal / Director of Greg Kelly & Associates Pty Ltd. Greg has been a licenced electrical contractor for the past 31 years and is a qualified electrical engineer. He has been an investigator for the past 30 years of which 27 has been involved in scene examination, firstly as a Crime Scene Examiner with the NSW Police and then principally involved in fire and explosion examination in private industry.

Comparison of Fire Investigation Practice

New Zealand and Victoria

Graham Davies

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Transalpine Region, NZFS

Introduction

A close working relationship exists between the Christchurch Metro Area of the NZ Fire Service and the Melbourne Metropolitan Fire Brigade (MFB) in Australia.

This cooperation originated from members of the MFB Fire Investigation Unit and the Victoria Police Forensic Services Department (VPFSD) visiting Christchurch to lecture at the joint NZ Police/Fire Service fire investigation course, held annually at the NZFS Woolston Training Centre. This course was originally put together by then-Detective Sergeant Ken Legat and has been running successfully for about 6 years now.

On the first course, two members of the VPFSD (Karen Ireland and Rachel Noble) came over and lectured on their role in determining origin and cause at fires. They also talked about the preservation of evidence and the correct method for handling exhibits recovered from scenes. Since that first course we have had members of the MFB Fire Investigation & Analysis Unit speak instead.

Station Officer Alex Conway has been over twice; he is an expert in gas installations and marine & vehicle fires. Station Officer Rod East, an electrical expert, has also participated. Both of these officers have been involved in writing the gas and electrical regulations in Australia. Commander Ian Hunter of the MFB Fire Investigation Unit has also visited Christchurch.

Through this existing trans-Tasman relationship, I was encouraged to join the Victorian Chapter of the International Association of Fire Investigators (VAFI) and to work towards achieving the MFB Certificate of Fire Technology (Fire Investigation). The first four modules are completed as distance learning programs with the final three modules being undertaken on-site in Australia over a three week period, working with the MFB fire investigators at fire scenes and sitting a written exam.

I was successful in making an application to VAFI for a training scholarship of \$1000, in order to enable me to travel to Melbourne to complete the course. This sum covered my air

fares and meals; accommodation was generously provided by the MFB.

Travelling to Melbourne in early September, I spent three weeks working with the MFB fire investigators, Police Forensic personnel and Police Arson & Explosives Squad on incident investigations around the area. I was also able to spend time with MFB Fire Safety staff who work in the areas of community safety, built environment, and compliance, as well as consulting with their Fire Engineers who are looking at computer modeling systems. At the end of the three weeks I successfully completed the course and was awarded my Certificate of Fire Technology.

As a follow-up to this trip, I was asked to make an evaluation of current fire investigation practice in New Zealand and to compare it with the system used in Victoria. I have summarized the procedure used in each of these locations, following this with a brief comparison of the two systems' relative advantages and disadvantages, as I perceived them.

The New Zealand System

Fire investigation in New Zealand is governed by the Fire Service Act and the National Commanders Instructions. There is also an impending Memorandum of Understanding between the Police and Fire Service (about to be signed off) which places responsibility for determining the origin and cause of a fire upon the Fire Service, and sets out the specific

roles of each agency when working at a fire scene.

Section 29 of the Fire Service Act provides "Access to lands and buildings" (other than household units) for the purposes of pre-incident planning and post-fire investigation. Although we do not have the right of access to a private household unit once an emergency is over or we have left the scene, we are able to make written application to the building owner seeking permission to carry out a later investigation into origin and cause. If a fire is deemed to be suspicious in a case where the Police are the lead agency, they can apply for a search warrant and we are then able to assist them in any investigation into the origin and cause.

The Fire Service has no right to take any samples or exhibits away from a fire scene; instead the Police will take control of any samples required for testing. If we locate any item at a scene that we believe may be of use to us for educational purposes, we must get the written permission of the owner before we can remove it.

The National Commanders Instructions make it clear that the NZFS Officer in Charge of an incident is responsible for determining the cause of the fire and completing the report. If they are unable to determine the cause, they can request the attendance of a specialist fire investigator in order to assist them.

The National Commander also requires that a specialist fire investigator respond in the following instances:

- fires where fatalities occur
- fires (other than those that occur in single residential dwellings) where people were unable to evacuate the building
- fires that occur in multi-storey buildings
- fires that spread from one fire cell to another, or from one structure to another
- fires where a sprinkler failed to contain the fire
- fires of an unusual nature or of special interest
- fires where the cause is suspicious or cannot be determined

At fatal or suspicious fires the scene is under Fire Service control, with the outer perimeter being secured by Police until no further danger exists. Once the fire emergency is over, control of the scene passes to the Police, who then become the lead agency on the incident.

We work closely with the Police and under their direction in order to determine the fire's origin and cause, then prepare a comprehensive report which is forwarded to them and also forms part of any Coronial Investigation or prosecution. We may be called upon to give evidence in court as expert witnesses. Insurance companies will frequently request a copy of our fire report

under the Official Information Act; this report may be used in the Civil Court.

Any samples taken by the Police are sent to Environmental Science & Research (ESR) for testing. They provide details of any accelerants found, which will then be added to our report.

Where the activities of a serial arsonist come to the attention of either the Fire Service or the Police immediate contact will be made with the other agency to ensure they are made aware of the connection between incidents.

Another agency that may be involved is the Energy Safety Service, which can provide experienced investigators for fires where the cause is believed to be electricity or gas.

If the media require information regarding a fatal or suspicious incident, the relevant Fire Service officer will comment on Fire Service operational matters and/or fire safety issues. Statements regarding cause and origin are generally given by a Police representative.

The Victorian System

As stated above, I have spent three weeks working with the MFB Fire Investigation & Analysis Unit and have also examined the Victorian Fire Investigation Policy & Procedures document.

It appears that the leading agencies in fire investigation in Victoria are the MFB, Country Fire Authority (CFA), Police Criminal

Investigation Bureau (CIB), Police Arson Squad, Victoria Police Forensic Services Department (VPFSD) and Energy Safe Victoria (Gas and Electricity).

The first response to a fire will come from the MFB for fires in the Melbourne metropolitan area or the CFA for fires outside the MFB area. Both agencies have their own Fire Investigation Units which respond to fires in their respective areas.

Command of the scene begins with the Fire Service, with the outer perimeter of the scene being secured by local Police until the fire poses no further danger. If the fire is deemed to be suspicious or a fatality has occurred the scene stays under Fire Service control (until it is safe) but the Police Arson Squad are notified and will, in turn, notify the VPFSD.

Immediately upon arrival at the scene of the fire the Senior Police Investigator and VPFSD personnel will confer with the senior member of the relevant Fire Service Fire Investigation Unit in order to assign respective roles and responsibilities, including the following:

Coordination at the scene: the Coroner or their legal representative (i.e. the Victoria Police)

Scene Investigation Origin and Cause: VPFSD staff and the relevant Fire Service investigator

Once the fire poses no further danger, control of the fire scene investigation is passed to the Police, and a joint Police/Fire Service examination of the scene is conducted using the team approach. Where a suspected suspicious fire is found to be non-suspicious,

the Officer in Charge (OIC) of the VPFSD unit advises the OIC of the relevant Fire Service Fire Investigation Unit and transfers all relevant documentation and exhibits into their custody.

If the media require information regarding a fatal or suspicious incident, the relevant Fire Service officer is authorized to make statements to the media relative to the fire services activities and the only comments about the cause and the larger investigation process are made by the Police who are authorised to speak on that topic.

Comparison between New Zealand and Victoria

The methods used to process and control a scene are very much the same at the two locations, with both using *NFPA 921* and *Kirk's Fire Investigation* as their guiding documents.

My observation and experience suggests that each region's approach has its own strengths and weaknesses, some of which I have listed below. Please note: I have only examined the way that structure fires are investigated, staying away from the area of vegetation fires.

Acknowledgements

I am very grateful to the VAFI, MFB and VPFSD for the opportunities they have provided, and look forward both to continued cooperation

between our agencies, and to sharing what I've learnt with my colleagues in order to further the work of the New Zealand Fire Service.

New Zealand Positives	New Zealand Negatives
<ul style="list-style-type: none"> • One fire service covering whole of New Zealand. • Ability to start and finish all fire investigations, even if it is a suspicious fire, including writing the report and giving evidence in court. • With the geographical spread of fire investigators, most fire investigations are no more than an hour's drive away. • The ability to build a closer working relationship with local Police. 	<ul style="list-style-type: none"> • Not having right of entry to household units. • Not having the right to take samples or suspect equipment for testing. • Not having a dedicated arson squad. Some fire investigators are in solo positions and have no immediate support. • Inconsistent standards of investigation. There are huge variations in the level of expertise between investigators, some of whom work in solo positions.

Victoria Positives	Victoria Negatives
<ul style="list-style-type: none"> • Forensic investigators on scene when required. • Forensic investigators are able to take any samples or suspect equipment and deliver them to the laboratory for testing. • The same person who carried out the investigation can test the samples. • The support of a dedicated arson squad. • Population size allows Victoria to have full-time fire investigators working in the MFB and CFA. • The VPFSD provide a consistent standard of investigation throughout the State. • All Officers have to complete a recognised fire investigation diploma course. 	<ul style="list-style-type: none"> • The demarcation between MFB and CFA areas. • When the fire is deemed to be suspicious the MFB or CFA have to pass it over to VPFSD. • The VPFSD have to travel throughout Victoria - some very long travel times. • Inconsistent levels of skill between MFB and CFA fire investigators. • The VPFSD investigators only attend accidental fires when a fatality occurs.