FIREPOINT

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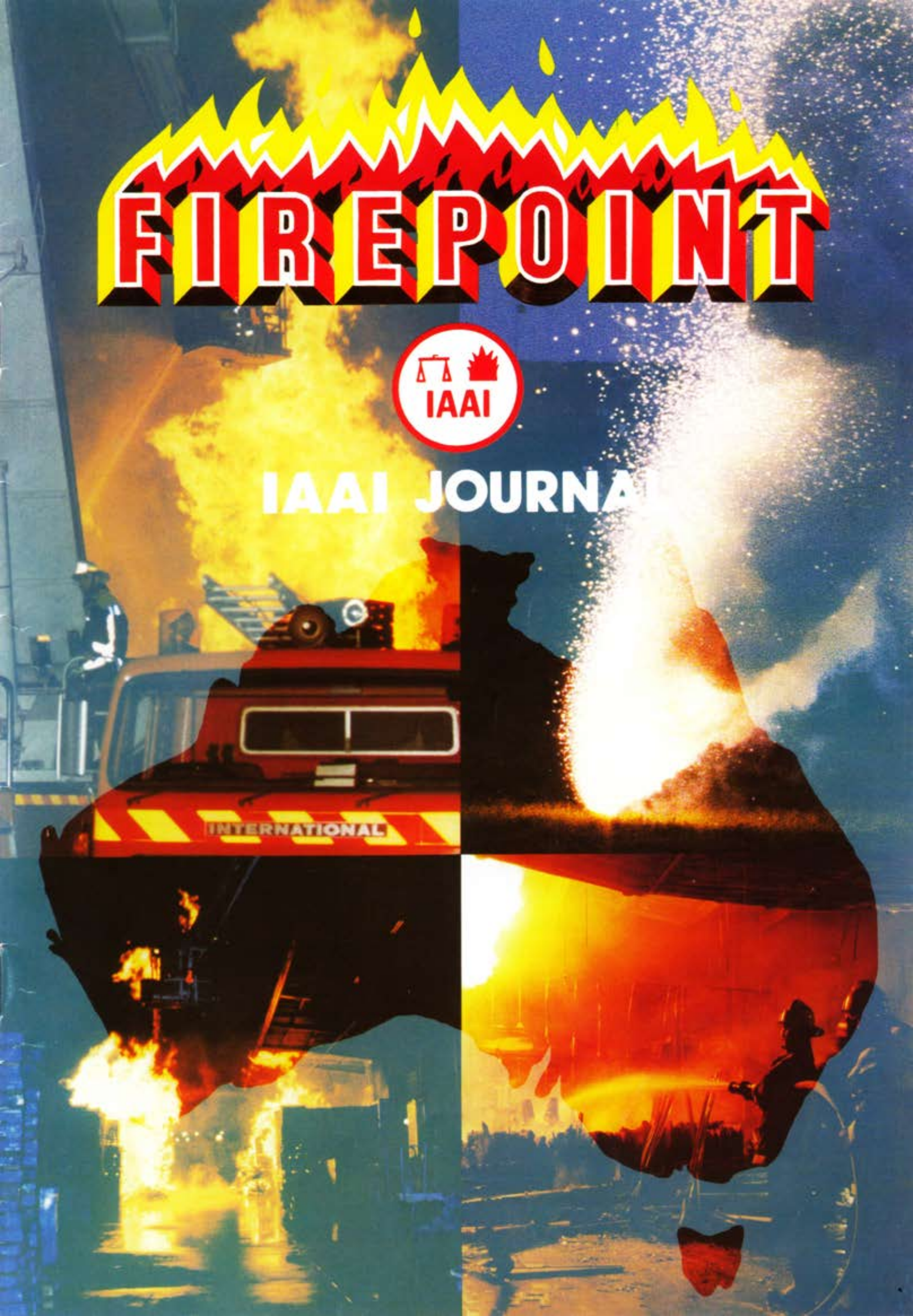
IAAI JOURNA



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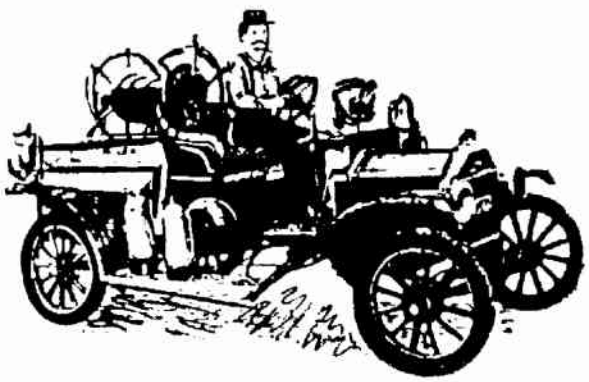
FIREPOINT: IF YOU HAVEN'T PAID YOUR FEES FOR THE CURRENT YEAR, PLEASE DO SO NOW.

EDITORIAL

Welcome to Firepoint 2012. Check out AAFI 2012 on page 5. Need nylon bags for fire debris samples. See page 6. Want an overview on electrical wiring. See page 9. For safety issues surrounding solar panels. See page 25.

Lots of interesting and relevant articles. Stick with us in 2012.

Wal Stern



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AAFI2012

Australasian Associations of Fire Investigators Conference
Melbourne Australia • 19-21 September 2012

The 2012 AAFI Organising Committee are currently working to put together an exceptional program for the conference andhave already secured a number of outstanding speakers who are sure to foster lively discussion and debate amongst delegates.

The committee has secured the following speakers:

Peter Mansi – UK Fire Service
Dr Rebekah Doley – Bond University
Peter Gallagher – NZFS
Craig Lapsley – Victorian Fire Commissioner and
Jim Munday

The program is still flexible enough to offer changes for further speakers.

Important 2012 AAFI Conference Dates:

Registration and Accommodation is now available on the Website.
Call for Papers still open till 30 March 2012
Early Bird Registration open till 16 Jul 2012
Accommodation Closes 13 August 2012
2012 AAFI Conference 19 – 21 September 2012

Members can get more information and costs at the website:
www.aafi2012.com.au

There are still opportunities for sponsorship support.
Register for the monthly Ezine Newsletters letting you know first hand what is happening.
Come to Melbourne and enjoy the Spring Racing or Aussie Rules football at the Weekend.

Don't be disappointed and miss this National Event. Only 6 Months to go.

CANINES IN WAR ZONE

ATF trained dogs save Marines in Afghanistan

Most people know the old cliché "a dog is a man's best friend," but for members of the U.S. military in Iraq and Afghanistan that sentiment proves true everyday.

In 2010, while on patrol in Afghanistan, members of the 2nd Marine Expeditionary Brigade were saved when a Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) certified explosive detection canine assigned to the unit discovered 15 homemade, improvised explosive devices.

"The patrol was at a safe distance from the IED when the dog, on its own, found the device and sat," explains Jeffrey Groh, ATF Explosives Training Branch Chief. "Canines are taught to 'sit' when they detect the scent of explosives. This allows their handler to know where the explosive material is hidden."

To combat the threat of homemade explosives and save lives, the Department of Defense teamed up with the Bureau of Alcohol, Tobacco, Firearms and Explosives to train dogs that can detect such explosives.

In addition to training canines at the Joint Military Working Dog Development Training Center in Yuma, AZ, ATF teaches dogs how to detect homemade explosive odors. Dog handlers learn to recognize his canine's change in behavior as a result of the animal's exposure to homemade explosive odours.

Since March, ATF has put a total of 206 canines into action detecting homemade explosives in combat zones. The program has proven to be so successful ATF canine trainers project they will train over 300 canine teams in fiscal year 2010 for deployment with the Army, Navy, Air Force and Marines.

The program has shown dogs are more than friends – they can also be life savers.

NYLON BAGS FOR FIRE DEBRIS

Jim Munday wants to know if any member would like to purchase nylon bags for the storage of debris from fire scenes. His offer is as follows:

"I am able to obtain some top-quality nylon bags for fire debris packaging at a discounted price if I buy more than 1000 at a time. As this is more than I need, I am happy to sell on the rest at cost plus p&p. The cost will work out at approximately $190 per 100 bags, 300mm width x 600mm length. Other sizes are available and can be ordered".

These are 40 micron Rilsan 11 bags manufactured from vegetable derivative, with no hydrocarbon contaminants, as supplied to Irish Gardai, British Home Office, Hong Kong Police and many other law enforcement agencies. If you are interested in a shared order, please email Jim Munday via ***office@fireforensics.com.au***

N.S.W. Association of Fire Investigators Inc.
(International Association of Arson Investigators (Chapter 47))

A Happy New Year to one and all. Welcome to our first "Firepoint" for the year. I hope that everyone had a pleasant Christmas and New Year without too many events taking place.

We have held our first education night for the year and it was warmly received.

We are going to try video conferencing shortly via the Video Links through the NSW Rural Fire Service so watch out for details through your emails from our Secretary, Jeff Compton. Here is initial the message Jeff sent out to NSW members:

Video education night!

The NSWAFI is always on the lookout for ways to try and improve the opportunities available for members, particularly in the area of education.

The committee is aware that members outside of Sydney do not have as easy access to the regular education nights.
We are exploring the potential of the RFS video links to try and bring education nights to our more remote members.

We plan to broadcast by video link an education night of 3 case studies.
We can connect to 9 remote sites. Most RFS fire control centres have a link.

We are asking for expressions of interest for this event. If you are interested in attending, email me back with your name, and your location, and your nearest RFS fire control centre, if you know it, and if you will be inviting any guests (please consider asking your fellow fire investigators, FSG, police, members of the insurance industry or interested firies). Based on numbers and travel times we will find the best 9 locations. For non-RFS personnel, we will find an RFS host for the event, to let you into the venue, etc.

Once we have an idea of numbers, I'll let you know the sites and contact people.

If you need any further information, email me or give me a call (0401840856).

Andrew Kerr and Alex Conway and the Conference committee have been working tirelessly in Melbourne to bring to you a top class Conference in September 2012, so please take the time to read the report in this issue of "Firepoint" or look at the website: http://aafi2012.com.au/index.html and see what is taking place.

If you have any suggestions for future education night speakers, please let our Secretary know as we are aiming to present a vast range of presentations for your education.

Mark Black

President

NSW AFI

Victorian Association of Fire Investigators Inc. Including Tasmania (VAFI)

Website www.vicfire.com

Hearty greetings to all our members. The Committee wishes you a happy and prosperous 2012.

The Committee regrets to announce that no VAFI scholarship was awarded for year 2011. This is because no-one applied. The scholarship is worth up to 1000 dollars for any study or work to assist the applicant to improve his or her fire investigation skills. The money is there for your use. Please consider an application. If you require some assistance, contact the secretary at R.Vandorsser@cfa.vic.gov.au.

The VAFI Committee is pleased to announce that the membership of the organisation now stands at 274. It seems to the Committee that the program of field days, discussion evenings, lectures and so forth is welcomed and found useful by the membership. Attendances at our presentations are high and we are reaching the stage where seating of interested people is sometimes difficult. Never fear, it is our intention to continue to present topical discussions and presentations, and to find venues which will accommodate all those who wish to attend.

We are now planning the 2013 program. What would you like to hear about? What would you like to see? Write and tell us please. Our aim is to provide the best we can. We will also continue to provide presentations in the regions, so our country members do not have to travel so far.

The next discussion meeting is on 8 March 2012 and will be held at the Police Academy Lecture Theatre in Glen Waverley. Professor John Barnett will be speaking about the investigation of the fire which engulfed the twin World Trade Centre towers. Notices have been sent out.

As you know, the next nationwide Conference is approaching. It happens on 19-21 September 2012. The sub-committee handling the arrangements is now heavily involved in final planning. Progress to date is on track for a great and interesting series of presentations in Melbourne. Try and get there if you can. If you cannot make the whole conference, then try for one day.

The search for sponsors for the conference is in full swing. Big or small, sponsors are an important part of the Conference, and the more support we get, the better it will be for us all. If you know someone who could be a sponsor, then now is the time to get them on board.

ELECTRICAL WIRING

AN OVERVIEW

AN INTRODUCTION TO ELECTRICAL WIRING INSTALLATIONS IN PREMISES

RUSSELL F. LEE FIEAust CPEng

INTRODUCTION

Electricity is a mysterious phenomenon. When OB1 Kenobe spoke of the "force being with you" he was describing something which pervades everything and which one could with certain skills, draw upon. Such is electricity. It is everywhere. It is in our bodies and most materials, and in the air around us. It cannot be seen but its effects can be seen and felt. In sufficient quantities it can be highly destructive and even fatal. Nevertheless it is very useful "stuff" when contained, controlled, and put to work. Electricity and its effects can be described using mathematical and physical means established by such famous persons as Faraday, Tesla, Bell, Siemens and Swann. A whole engineering discipline has grown around the work of these important men.

Fundamentally electricity behaves in much the same way as water. As water can be made to flow under pressure in a pipe, can be stored in a dam, made to do work, or can be pumped up a gradient, so can electricity. That is electricity can be made to flow (current) under pressure (voltage) and can be confined (in conductors) or stored (in batteries and other special devices), made to do work (in motors and light bulbs), and can be pushed up a gradient (generated). The analogy is very useful in Court.

Electrical wires, cables or conductors are the means by which electricity is transferred from one point to another. Using the water analogy, the wire or cable is the equal to the pipe.

NOTES ON ELECTRICAL WIRING

1. Electrical cables and wires are used to contain and transport electricity from one point to another. They may be un-insulated over their length or they may be insulated.

2. Insulation is the medium by which conductors can be spaced closer together

than would be the case without insulation. It is the insulation which prevents the electricity from jumping from one conductor to the other. Bringing the conductors closer together creates a very high electrical and mechanical stress in the insulation which is proportional to spacing and to the voltage between the adjacent conductors.

3. Wires which are run overhead are usually air insulated and are supported at intervals on porcelain insulators. The spacing of the conductors is related to the ability of air to act as an insulator when under pressure from the electric field generated by the conductors. Recently however the use of insulated aerial cables has become more common particularly in areas where many trees overhang the wires.

4. Cables and wires intended for underground installation or for installation into conduits, walls, ceilings and appliances are insulated with a variety of materials which are able to control the electric fields generated therein to the degree that conductors can be spaced closer together than would be the case with air insulation.

5. Older insulating materials include rubber, glass, paper, oil impregnated paper, porcelain, bakelite, pitch, and resin impregnated timber.

6. Typical modern materials include butyl-rubber, polythene, poly-vinyl chloride, cross linked poly-ethylene, silicone rubber, oil impregnated paper, butyl-mastic compounds, fibreglass, epoxy-resin, and glass. The working voltage and environment dictate the type of insulation to be used.

7. For a given voltage, flexibility and the ability to withstand heat are the essential requirements or cable or wire insulation.

8. Flexibility usually reduces with age as the plasticisers in the insulation material dry out. This is particularly so for rubber and thermo-plastics such as polythene and poly-vinyl chloride.

9. Heat reduces the ability of an insulator to withstand voltage and therefore all insulating materials are rated for a maximum operating temperature. Excessive heat or prolonged exposure will reduce the working life of the material.

10. Installations wired before about 1945 were made with cotton covered,

vulcanised india rubber insulated (VIR) cables run either in wooden ducts or in steel conduit. There are thousands of these installations still in service and they have all exceeded their normal working life of about thirty years. Many have decayed to the state of being dangerous although many will continue safely in service unless disturbed.

11. Degraded installations are characterised by brittle insulation with often exposed conductors, and rotten insulation (sticky to the touch) with rubber weeping through the cotton covering.

12. Many VIR installations are sound because they have never been overloaded or disturbed. Typically though the damage is done at the terminations to switches, light sockets and power outlets where more heat is generated.

13. Between about 1945 and 1960 domestic and commercial installations were wired with tough rubber sheathed and insulated (TRS) cables. This material was developed during the war and has shown good service. There are thousands of these installations in service and such installations are now at the end of their serviceable life of about thirty years.

14. TRS installations exhibit the same problems as VIR installations.

15. Since the early 1960's domestic and commercial installations have been wired with thermoplastic (polythene) insulated and sheathed (TPS) cables and wires. Some of the earlier plastic compounds suffered from rapid loss of plasticisers which made the insulation stiff and brittle, but later cables were satisfactory.

16. Generally these installations are still within their serviceable life but the installations typically have a smaller margin of safety with respect to temperature. Indeed temperature rating is very important in selecting a particular cable insulation. Not only can excessive temperature degrade the insulation but it can also melt thermoplastic insulating materials causing them to flow from the conductor.

17. Modern industrial installations use a variety of cables and wires using all of the modern insulating materials mentioned previously.

18. Major difficulties can arise when an attempt is made to partially rewire an old installation, or to install new accessories (switches and outlets) onto old wiring. In both cases the old insulation is disturbed and faults may follow soon after. In addition the circuit loadings used in modern installations are generally higher than for old installations and the old wiring in partially rewired installations is often subjected to higher operating temperatures.

19. Note that problems are unlikely to arise in the middle of a cable run (unless mechanical damage is involved) but typically occur at terminals or junctions where contact resistance may lead to local overheating.

20. Failure of the insulation may be by carbonisation due to heat, or contamination or moisture leaking in through cracks. A fault generally develops and may be low gradeor catastrophic. Both can start fires.

21. The design of electrical accessories such as light switches, power outlets, fuses, light sockets and terminal boxes is based upon the ability to dissipate heat at the nominated current rating.

22. Not only will overloaded accessories cause damage to the insulation on wires and cables connected thereto, but the heat generated also damages the insulating properties of the accessories themselves.

23. Degradation of the thermo-set plastics used in accessories usually causes carbonisation of the insulation and the creation of a leakage "track" whereby the current can leak to earth and a fault generally develops. The fault may be low grade or catastrophic.

24. In serious cases of overloading, the switch (say in a power outlet) may not be able to disconnect the supply and arcing or welding may occur. Severe localised heating generally follows.

25. The electricity safety Acts and Regulations in each State and Territory provide the basis for regulating the generation, supply, reticulation and use of electricity.

25. The Acts or the Electrical Safety Regulations make mandatory the Standards Australia (SAA) Wiring Rules AS/NZS3000. Those rules are enforced for domestic, commercial and industrial installations. In addition AS3000 makes mandatory a number of other Standards in the AS3100,

AS3200, and AS3300 series, which affect the manufacture of electrical materials, fixtures and appliances. Some appliances and accessories are subject to prescription under the Acts and must comply with the above Standards. Failure to comply renders the installation or appliance illegal.

26. With the onset of privatisation in the 1990s, the supply authorities ceased the inspection of electrical installations beyond the connection to the Main Switchboard of the premises. Responsibility for safety and compliance now rests with the electrical contractor who installed the works. Certificates of Compliance and Electrical Safety now form an important part of the control of electrical work.

27. Designers and installers may now be required by local Councils to certify that the installation complies with the relevant Standards and Regulations before a certificate of Occupancy is issued.

28. The Regulations and the Standards are updated regularly and the usual attitude of the supply authorities is to require compliance with the current regulations for a particular piece of work. The result is that work which complies today may not comply tomorrow. Clearly the older installations cannot comply because of improving standards over the years. This factor brings with it some risks for fire investigators.

29. Where a major portion of an installation is to be upgraded the supply authorities usually require that the whole installation (including that part not intended by the proprietor for upgrade) be upgraded. This involves considerable extra expense. To avoid such expense, some proprietors may not notify the changes they intend although it is illegal to carry out work which has not been notified. Domestic premises regularly fall into this category so be aware of the possibiloity of illegal or non-compliant work which might stll be energised.

30. Another hazard for fire investigators is the use of back-up power systems. If a generator is involved, it can be generally disconnected without too much trouble. Howveer if an uninterupptible power supply is involved, careful attention is required. Such systems deliver 415/240 Volts and may involve batteries which deliver high voltages. Disconnection requires great care.

31. Keep in mind that the bigger back-up systems are usually obvious. It is the

smaller "under-bench" systems associated with supplies to small computers, which will deiliver at 240 Volts and are hazardous.

32. Keep in mind also that emergency lights have batteries and inverter systems which can deliver high voltages. They present a hazard.

33. Remember that just because a battery has been burnt in a fire, it is not necessary safe to handle. Batteries contain high energy levels and they can discharge that energy reapidly if not handled carefully.

34. 34. A more recent hazard is the installation of solar energy systems in dwellings and some commercial premises. Switching off the main switch in an installation will not necessarily disconnect any solar system or associated batteries.

35. The electrical work carried out by proprietors and tenants without the aid of a licensed electrical mechanic is a constant risk faced by insurers. Ignorance of the safety rules leads to electric shock, fire, and death. Ignorance of the correct rating of circuits and appliances leads to overloading and overheating of accessories and wires, and an accelerated ageing of insulation. Fortunately for insurers such illegal work is generally immediately obvious to the trained eye.

36. More serious in many cases is the common practice of using the wrong fuse wire in, or doubling up fuse wires in porcelain fuse carriers in domestic premises, or the use of fuse wire instead of cartridge fuses in carriers designed for cartridges. Both expose the installation to greater risk. Fortunately such abuse is immediately obvious to the trained eye.

37. Electric arc melts or erosion are common indicators of electric faults. Discolouration and oxidation of copper or brass contacts or terminals are often an indication of long term overheating. Loose wires or screws in terminals are often an indication of poor connections. Note however that the fire also has an effect on the above and may mask the clue being searched for, or destroy the evidence.

Firefighter Safety and Photovoltaic Systems

In Australia and elsewhere overseas, there have been concerns about the safety for firefighters in structures with photovoltaic systems. Increasingly they are seen on rooves of our houses. This article examines such systems to examine the risks involved.

The study resulted in the development of an online training module for fire fighters. This article examines the problems and provides the link to the training module.

Under the United States Department of Homeland Security (DHS) Assistance to Firefighter Grant Program - Fire Prevention and Safety Grants, Underwriters Laboratories US examined fire service concerns of photovoltaic (PV) systems and the potential impact on firefighting operations.

These concerns included firefighter vulnerability to electrical and casualty hazards when mitigating a fire involving photovoltaic (PV) systems. The need for this project is significant due to the increasing use of photovoltaic systems, growing at a rate of 30% annually. As a result of greater utilization, traditional firefighter tactics for suppression, ventilation and overhaul have been complicated, leaving firefighters vulnerable to potentially severe hazards. Though the electrical and fire hazards associated with PV systems have been known for some time, a very limited body of knowledge and insufficient data exists to understand the risks to the extent that the fire service has been unable to develop safety solutions and respond in a safe manner.

This fire research project developed the empirical data that is needed to quantify the potential hazards associated with fire scenarios involving PV installations and provides the basis for the development of firefighting operational practices to reduce firefighter death and injury.

A functional PV array experimental fixture was constructed outdoors at UL's Northbrook, IL campus. This fixture provided for experiments to:

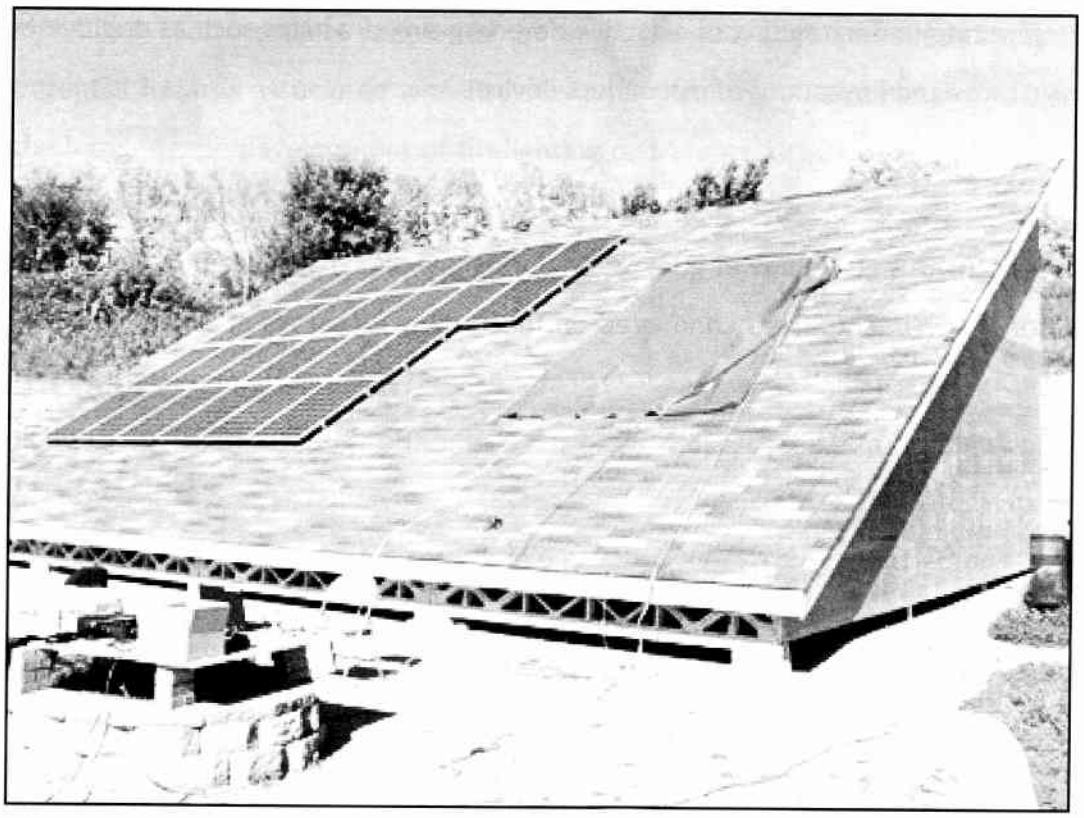
- Develop knowledge of the hazard of the application of water to PV installation during suppression tactics.

- Generate understanding of effective de-energizing practices such as deployment ofsalvage tarps and limitations of disconnect devices.

- Address concerns about power generation during low and artificial light conditions.

In addition, experiments were conducted on functioning PV arrays at Delaware County Emergency Service Training Center. A series of experiments were conducted on three PV technologies - metal framed glass on polymer, flexible laminate, and building integrated roof shingles. Fire experiments were designed to represent a room of content compartment fire which evolved to a structure fire ending in collapse. Experiments were also conducted on a rack mounted PV arrays to represent a debris fire under the PV modules above the roof. Following the fire experiments, the PV modules were examined to determine their ability to generate power representing potential safety hazards for firefighters, particularly during overhaul operations.

The results of these experiments provide knowledge for the fire service for them to examine their thought processes, standard operating procedures and training content. Several tactical considerations were developed utilizing the data from the experiments to provide specific examples of changes that can be adopted based on a departments current strategies and tactics.



Online Training Program

In order to make the results of this study more user friendly for the fire service to examine, UL developed an online interactive training module. The program includes a professionally narrated description of all of the experiments, their results and the tactical considerations. Experimental video is used and graphical data is explained in a way that brings science to the street level firefighter. This module can be accessed at *http://www.ul.com/global/eng/pages/offerings/industries/buildingmaterials/fire/fireservice/pvsystems/*