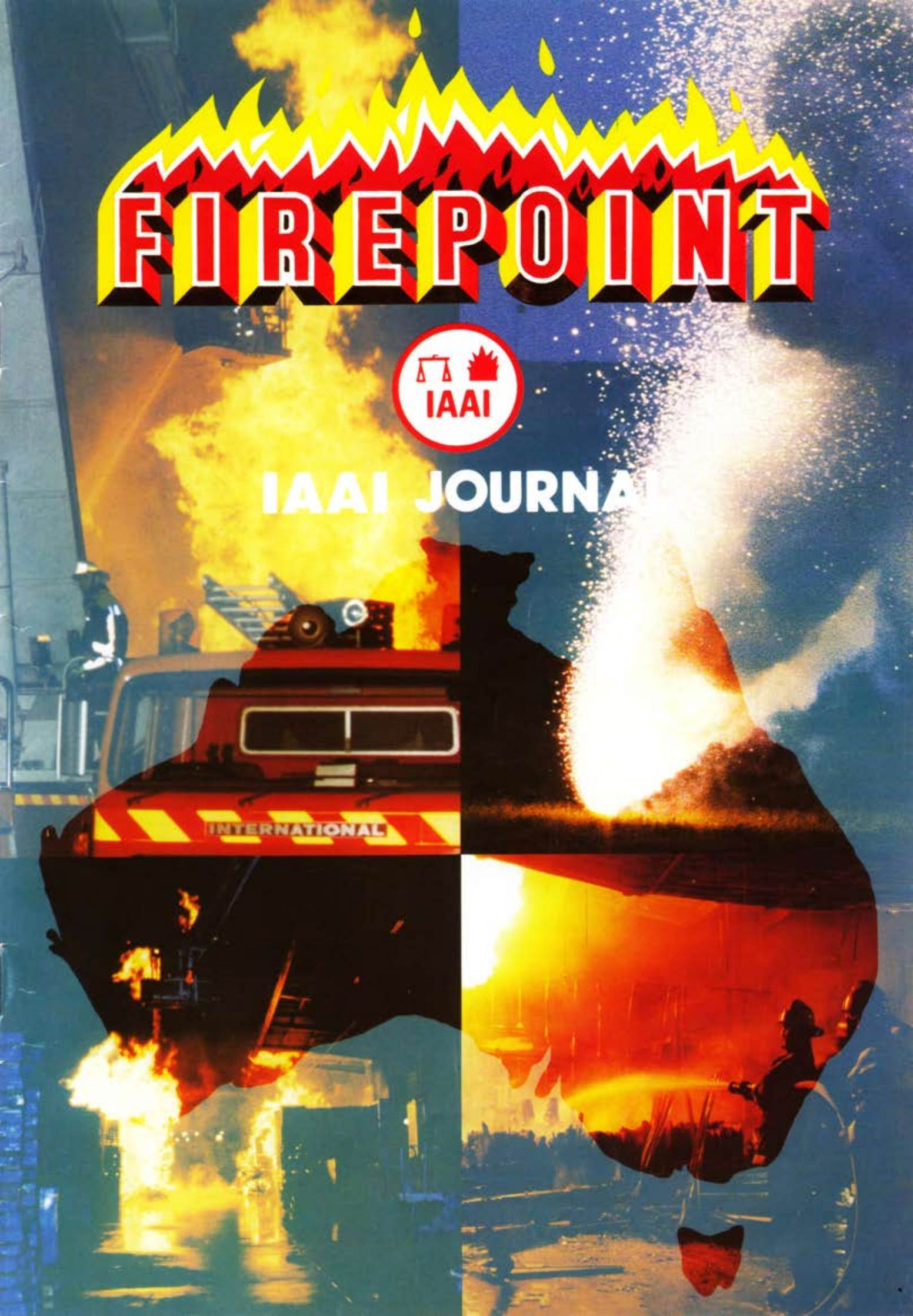
FIREPOINT
IAAI
IAAI JOURNA
INTERNATIONAL

June, 2001 Volume 12, No. 2

Firepoint

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EDITORIAL

STOP PRESS

Queensland Chapter wins OUTSTANDING CHAPTER AWARD of the IAAI. At its AGM in Atlantic City on 24th May, 2001, the Queensland Chapter was announced winner of this prestigious award. Congratulations, Queensland.

On a personal note, I have always found the Queensland Chapter well organized, and dedicated to the task. I would like to record my personal thanks to Julianne Foley who for a number of years has been a most wonderful organizer of material from Queensland for this magazine.

The University of Technology, Sydney has a four year Forensic Science Honours Degree course. One of the subjects taught in that course is Fire Investigation. In this issue are included one of the essays students have written for this course (p.15), and also a summary of one of the Honours projects undertaken as part of the course (p.12).

Wal Stern

CONTENTS

Vol. 12, No. 2, June, 2001

QUEENSLAND NEWS

PRESIDENT'S WELCOME

Our Annual General Meeting was held on the 27th March 2001 at which President Charles Foley decided to step down due to increasing work commitments. On behalf of our members, I wish to thank Charlie for his hard work and dedication to the Association throughout 2000. Charlie remains on the 2001 committee as Immediate Past President.

The 2001 Committee members are listed below, together with their portfolio responsibilities. All members are welcome to contact committee members and participate in sub-committee's that are formed.

2001 QAFI EXECUTIVE COMMITTEE

The following Association members were elected to their positions on the 2001 Executive Committee unopposed.

- **President** - Greg Reynolds, QFRA – FIU *(Major Project, Education/Training)*
- **1st Vice President** - Michael Drummond, Tress Cocks & Maddox *(Major Project, Membership)*
- **2nd Vice President** - Kate Ridgway, Carter Newell *(Newsletter/Firepoint)*
- **Secretary** - Lisa Bundesen, Hall Chadwick Forensic Accounting *(Web Site)*
- **Treasurer**- Gary Nash, Forensic Services Australia *(Functions)*

Committee

- Alan Faulks, DIR Electrical Safety Office *(Major Project)*
- Kate Hitchens, Kennedy's Forensic *(Major Project)*
- Michael Holohan, Scientific Section - QPS. *(Major Project, Membership)*
- Trevor Pohlmann, RACQ Insurance Ltd *(Major Project, Education/Training)*
- Michael Shield, LAC Loss Adjusters *(Functions)*
- **Imm. Past President** - Charles Foley, Zurich Aust. Insurance

Honorary Solicitor

- Quentin Owen, Hunt & Hunt

IAAI ANNUAL CONVENTION – Atlantic City

Michael Holohan is the Queensland Chapter's recipient of this years IAAI Educational Foundation Off Continent "Train The Trainer" Grant.

Michael is employed in the Scientific Section of the Queensland Police Service.

The grant will assist with Michael's costs in traveling and registering to attend the IAAI Annual Convention & AGM being held from the 20th - 25th May in Atlantic City, New Jersey.

There are over 60 educational choices in this year's programme, spanning the entire spectrum of interests in the field of Fire Investigation.

We wish Michael a safe trip and look forward to his return when a presentation will be made to members on what he learned.

MEMBERSHIP

Outstanding Renewals

There are still a few members who have not as yet renewed their membership despite reminders being sent. Those members will be receiving a letter this month confirming that their membership has lapsed.

Updated Contact Details

As part of the QAFI's commitment to providing service and information to members in the most efficient manner possible, we are seeking members assistance in verifying their contact details including current e-mail address.

A personal letter has been sent to every member providing the contact details that we currently have on file and requesting advice of any amendments.

Please take a few minutes to check your details, make any changes on the letter and return to Julianne by fax (07) 3822 3900 or alternatively by e-mail.

If you have any queries in relation to membership, please do not hesitate to contact Julianne Foley on (07) 3822 4700 or e-mail admin_officer@qafi.asn.au

QUEENSLAND NEWS

OUTGOING PRESIDENT'S ADDRESS AT A.G.M. *(C. Foley)*

As we wind up another year we look back and reflect on the first 10 years as an association dedicated to investigating fire and understanding how fire behaves.

In the past couple of year's earthquakes, flood and other severe weather patterns have captured the headlines.

However, fire is still the biggest cause of damage to property on the planet. Fire causes more trauma to humanity than any other catastrophe. This is because FIRE occurs more frequently than any other catastrophe.

Every day firefighters, both professional and volunteer place their lives on the line to combat fires caused by;

- natural causes,
- the intervention of man – for a myriad of motives from profit to revenge and;
- to the mental ailment of pyromania.

What did we do in 2000?

Apart from the House-warming Workshop held in March of 2000, we recognised the people who made the first 10 years successful at a special function held in September.

At this function the President's for our first 10 years were recognised for the effort and hard work that they gave to this association's success. People who have served on the committee and have been members since it's foundation were also given the recognition they deserved.

Our record over the past 10 years has not gone without recognition. The Qld Association of Fire Investigators is being nominated for the IAAI "Outstanding Chapter Award". Greg Hancock of the NSW AFI has submitted the nomination setting out our activities and achievements to the IAAI. The recipient Chapter will be announced at the IAAI AGM & Conference, which this year is being held in Atlantic City, New Jersey.

Following our major project that was held at Moggill the year 2000 could be described as one of consolidation and planing for the future.

There will be a major project in 2001. It would be imprudent of me to elaborate on the project and the incoming President will undoubtedly provide information about the project once the plans have advanced further. The incoming President and committee will definitely have their work cut out for them.

This year the committee nominees consist of some of our newer members. I am extremely pleased to see younger members putting up their hand to work for our association.

It is these people who will bring a new energy and enthusiasm, which in my opinion augurs well for the future of our association.

During the year the committee looked at the past and deliberately opted for fewer functions. The reasons being that it is difficult to constantly locate and obtain keynote speakers that will attract all members.

We also recognised that we are competing against many other associations such as ARIMA, Brisbane Insurance Club, and Women in Insurance etc. etc. etc.

We are also competing with "the new economy". By the new economy, I mean the new levels of productivity expected of all personnel coupled with higher levels of accountability that make it difficult for committee members and indeed all members to commit to what is required of all members.

Whilst it has been quiet for the past months there has been a great deal of activity by the committee and I believe that your President and committee for 2001 will lift the QAFI to a new level of professionalism and awareness.

On a disappointing note it was with shock and consternation that one of our members and indeed the QAFI were maligned by a national television broadcaster. The majority of people who know Peter Thomas know the allegations leveled at him, and by his membership in our association, know the allegations to be false. This was probably one of the saddest days in my professional life to watch character assassination carried out on a human being especially knowing that the story was blatantly false and misleading in it's portrayal of fire investigation.

Our association will support any member who is unjustly accused of impropriety. The committee at a special meeting agreed unanimously to follow up the allegations with some of the people who made the accusations.

In conclusion it has been a privilege and a pleasure to be the President of the Qld Association of Fire Investigators.

Letter to the Editor

The following letter was forwarded to the Queensland Association of Fire Investigators from Grant McKay, with a request that it be published in the "Firepoint" Magazine.

I refer to the letter by Mr. Peter Thomas complaining about the ABC Four Corners program with which I was involved. Please bear in mind I am responding only in relation to what Mr. Thomas has written about me. I do not speak for Mr. John Higginson and I am sure he will respond as he sees fit.

Mr. Thomas has used this forum to call upon the (QAFI) Association to either have me 'account' for my conduct and provide evidence in support of what was said during the program 'Burned' or 'be dealt with by way of exposure and expulsion from the list of insurance providers'.

Frankly, I could not have provided a better example of the way Mr. Thomas appears to 'place the facts way down on the list in terms of his investigations' than to refer directly to his letter.

If he had bothered to enquire, he would have realised that the material used by the ABC was thoroughly 'vetted' by their legal representatives before going to air.

He would have made sufficient enquiries to learn that I do not make my living in the insurance industry. He would have contacted the QAFI to see if I was indeed a member of that Association. I am not.

He would have checked the list of service providers to see if I appeared on that list. I do not.

He would have checked to see if I am accountable to the Association. I am not.

Frankly, sometimes it is better to keep quiet and have people suspect the worst than to speak up and prove it beyond doubt.

Grant McKay
Investigative Consultant

(Address Withheld)
(by Request of)
(the Author.)

Red Flags of Arson and Fraud

Preliminary interviews did not make sense.

Owner's actions were inconsistent with normal victim behaviour.

Owner's family were there the morning of fire.

Time frames of activity did not match witness statements, or independent facts.

Owners minimized the problems with the residence.

Owner had several possible accidental causes for the fire. None matched the physical scene damage.

Informant information received was verified by third party methods.

Information from owners changed from contact to contact.

Fire was an arson fire.

Initial interview of owners was vague, inconsistent, subsequent interviews became more detailed, and each time changed significantly.

Story of owners changed after an attorney was hired.

NEW SOUTH WALES NEWS

Send us Your E-mail Address, Please

E-mail is the communication medium that is used by just about everyone these days. If it's not a home e-mail address then it's one used at work. When compared to sending a letter it's not hard to see why.

A master list of all of our members e-mail addresses would allow us to provide information of events and reminders of dates and times quickly and easily.

To enable us to do this would every member with access to an e-mail address please send a short message with your name and address, e-mail and phone number. We can then include it on a master list. All members without an e-mail address will still receive the information by post. Please send this information to Wal.Stern@uts.edu.au

Annual Conference

The organising of the August Conference took a giant leap forward when we obtained the services of Glenn Gibson, who will be the main speaker at the event. This came about due to the great efforts of Mitch Parish who has been working hard behind the scenes to bring off this result. Here is what Mitch had to say about Glen Gibson.

"Here is Glenn Gibson's CV. It is very impressive (and reads like War and Peace).

He is the C.E.O. of Crawford Loss Adjusters (Canada). Crawford's are probably the largest Loss Assessing firm in the world with offices worldwide including an office in Chatswood.

From inquiries I have made with other parties, Glenn is very well respected in the North American Fire Investigation and Assessing industries and for the past 15 years has been very much "hands on" in regards to Fire Investigation, Fire Fraud, and Arson for Profit investigation, training and presentations. He has been recognised in Canadian Courts as an Expert Fire and Fraud Investigator and is both a Certified Fire Investigator and Certified Fraud Investigator.

He has been a long standing instructor at the ATF College on Arson for Profit. He is a past President of the Ontario IAAI Chapte".

Apart from Glen Gibson, a number of other well respected speakers have been secured, including Eric Du Pasquier, from the University of Technology, Sydney, a forensic dentist, and representatives from the DPP. The Conference is shaping up to be a top event. It is on August 3 and 4.

So it's a big thank you to Mitch and my advice is to get in early for this year's conference.

Please don't forget to e-mail your details so we can keep you up to date. Send your e-mail to Wal.Stern@uts.edu.au

Don Walshe
NSW President

Membership

A final reminder. If you have not yet paid this year's membership, please do so now. Send your cheque for $40, with your e-mail address and your mailing address to the NSW Association of Fire Investigators, PO Box 689, Chatswood, NSW 2057.

Notice of Motion

At the AGM to be held in August, 2001, it is proposed to put forward a motion:

"That a quorum for a Committee Meeting of the Association be five".

The quorum at present is seven. There have been occasions when a smaller number have been present at meetings, and been unable to carry out some functions.

SAFETY BULLETIN

THE HIDDEN DANGERS OF FIRE INVESTIGATION

Investigators and other interested parties should be fully aware of the dangers posed on entry into a fire scene after the fire appears to be out.

The risks posed by gases and vapours during the smouldering phase of the fire should not be ignored.

There is substantial evidence showing that significant health risks do exist during the smouldering phase, but because those risks aren't as immediate as during the flaming stage, we tend to accept them and be less conscious of safety.

During the smouldering phase the risk changes from an immediate risk to health with an acute affect (due to heat, smoke and high concentrations of toxic gases), to a long term risk (presenting a chronic exposure hazard to personnel). The repeated dose exposure to chemicals does eventually cause health problems, particularly when those chemicals build up slowly in our bodies over a number of years.

Many of these chemicals are carcinogenic and/or systemic poisons and they are still being produced by incomplete combustion when the fire is smouldering.

We believe that there is definitely a need to start changing the culture of investigators to raise everyone's awareness of the hazards of working in a fire during the smouldering phase of the fire.

The use of self contained breathing apparatus (SCBA) is not always possible, however there are other ways of minimising the level of exposure and from an industrial hygiene perspective. There are many ways that this can be achieved.

It can be achieved by increasing the air flow through an area to disperse gases and vapours more quickly (**ventilation**), by minimising working times and maximising rest periods (**reduced exposure**), by using good hygiene practices and ensuring that all staff wash their hands and face before they have refreshments or before smoking (**decontamination**), and by wearing items such as dust masks and eye protection where SCBA is not practical (**personal protection**).

We need to protect ourselves against atmospheric contaminants containing toxic materials, including dioxins, some of which are the most toxic substance ever produced by man.

It's not only that loose tile on the roof or the weak floor boards that we need to be careful of. It's the less obvious dangers in the air we are breathing that could have the greatest adverse effect on your health.

Don Walshe. & Peter Stacey
N.S.W.F.B. FIRU & HAZMAT.

A simple message, but one which all who visit fire scenes should heed. It can guard your health..

NSW ASSOCIATION OF FIRE INVESTIGATORS INC
(IAAI CHAPTER No.47)
P.O. Box 689
CHATSWOOD, NSW. 2057

Phone: 02 9884 9900
Fax: 02 0994 9911

INFORMATION SESSION

FORTHCOMING MEETING;

DATE ---TUESDAY JUNE 26 th 2001
TIME --- 6 PM. For 6:30 Start.
PLACE --- N.S.W. FIRE BRIGADES TRAINING COLLEGE
WYNDHAM St. ALEXANDRIA.

TOPIC—OCCUPATIONAL HEALTH AND SAFETY FOR FIRE SCENE INVESTIGATION AND FIRE PERSONNEL.

Due to the interest shown in this session that was first presented in March, it is being held again.
The aim of the session is to expand knowledge of fire scene procedures and is designed to be of interest to all personnel who attend fire and explosion scenes in every capacity ,not only investigators.
The information workshop is FREE OF CHARGE and *all are welcome to attend.*
Mr Peter Stacey of the N.S.W.F.B. Hazmat unit will present the session.

Please RSVP. To enable us to prepare Phone: 97427395 or e-mail – donald.walshe@nswfire.nsw.gov.au

Victorian News

Training Sessions

The following is a list of proposed training sessions for 2001:

July - VAFI AGM with Guest Speaker.

August - Session to be advised.

September – Wildfire Investigation. MFB Training college.

November – Court Procedures.

Details of each session will be forwarded to each member prior to the session. It is important that each member books via the contact numbers.

If anyone has any special requests or ideas for training sessions please contact any of the committee. Days and times for training sessions are planned to allow as many as possible to attend, but this means planning your own diary and booking early.

Training Session. Car Fires.

On the 22nd March there was a session on Motor Vehicle Investigations presented by Paul Murrihy from the Victoria Forensic Science Centre held at the MFESB Training College.

Although a short session members, were able to exchange ideas and talk after the presentation while enjoying supper. Our thanks to Paul for his time and presentation.

Membership

The Chapter's membership is still increasing, with another four new members over the last month. New members are still welcome. It is important that all members renew their membership, which is due as of 1st July.

Invoices will be forwarded to remind everyone. The best time to pay is at the AGM in July.

Committee News

The committee for the Chapter have sponsored a Morning Tea for the many members of the CFA in the VAFI at the Country Fire Authority State Fire Investigation Conference on the 2/3 June 2001 at Ballarat, in order to support members and to support the training of fire investigators throughout the State.

As part of our support to other organizations the chapter donated $250.00 to the Royal Children's Hospital, Safety Prevention Centre as an ongoing donation to the safety of children and the burns unit.

The Chapter also partly sponsored Ross Brogan, the Representative for all Chapters in Australia to attend the IAAI International 2001 held in Atlantic City, New Jersey USA from 20-25 May 2001.

As a result of this, Ross will be attending our AGM in July as the guest speaker to report on the Conference and any other information regarding his trip. This should be of interest to all members as this is the international body we belong to.

Please come along on that occasion. Look forward to seeing you.

THE EVIDENTIAL VALUE OF PETROL RESIDUES IN CASES OF SUSPECTED VEHICLE ARSON

K. Cavanagh[1], E. Du Pasquier[1] and C. Lennard[2]

1. Department of Chemistry, Materials and Forensic Science, University of Technology, Sydney, PO box 123, Broadway NSW 2007, Australia.

2. Forensic Services, Australian Federal Police, GPO Box 401, Canberra ACT 2601, Australia.

One of the major objectives in the investigation of any suspected arson is the isolation and identification of residual accelerants from the fire debris.

A recent study of laboratory casework [1] determined that out of 1040 individual items submitted for analysis, 17.6% were from motor vehicles, and of these motor vehicle samples items, 48.1% contained ignitable liquid residues. Petrol (gasoline) was the most frequently detected ignitable liquid, accounting for 78.4% of positive results in motor vehicle samples [1]. Similar results have been reported by other forensic laboratories [2]. The significance of the presence of petrol in motor vehicle fires has been challenged due to the possibility of natural occurrence of petrol residues inside the vehicle.

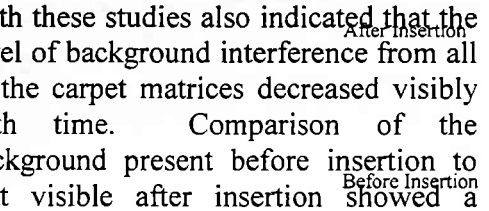
This study was undertaken to test the theory that there is a natural occurrence of petrol on the carpet or carpet mats of motor vehicles in the general population. Part of this study was also to determine what levels of background interference due to the carpet matrix are likely to be encountered. The study was conducted in three parts.

A persistence study was conducted to determine the evaporation and persistence of unleaded petrol on carpet. The results indicate that small volumes of petrol (less than 100μL) are unlikely to be detected on carpet after a 24 hours period. Larger volumes will be detected after this period, but will not be detectable after one week. The petrol that is detected exhibits a chromatographic profile of greater than 60% evaporated petrol.

A known history study was conducted by the insertion for varying lengths of time of carpet mats into the driver area of separate vehicles, and subsequent analysis for the presence of petrol. A history sheet was completed by the occupants of the vehicles during the insertion periods to record the frequency of contact with petrol, and usage of the vehicles.

The results indicate that petrol will not be found on previously uncontaminated carpet mats after a six week period of use in a vehicle, however the occupation and behaviour of the occupants can affect the type of compounds deposited onto the carpet.

Both these studies also indicated that the level of background interference from all of the carpet matrices decreased visibly with time. Comparison of the background present before insertion to that visible after insertion showed a noticeable reduction in interference levels.



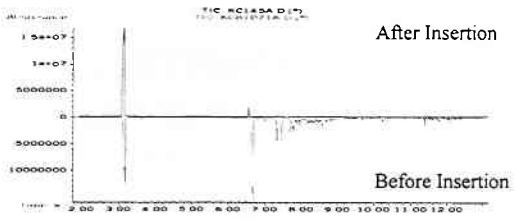
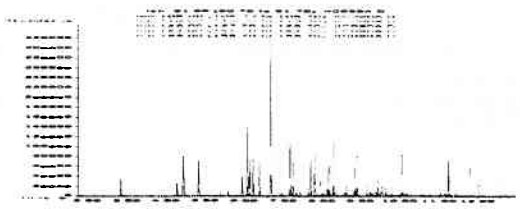
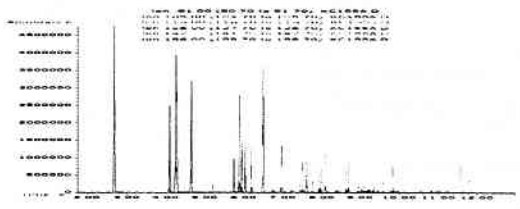


Figure 1: Chromatographic profile of Known History Sample, after insertion for 6 weeks, and mirror image Chromatogram of background before insertion

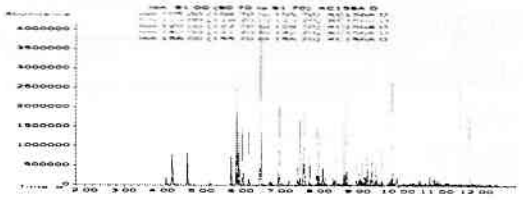
An unknown history study was conducted via the collection of carpet (41) or carpet mat (109) samples from vehicles with an unknown history, and subsequent analysis for the presence of petrol. Only six of the 150 unknown samples (representing 4% of the total number) were determined to contain petrol. Of these, only one sample was original carpet, and the remaining samples were carpet car mats. These results indicate that only a small proportion of motor vehicles will exhibit the presence of petrol, and then as evaporated petrol.



60% Evaporated Petrol



Unknown Sample



90% Evaporated Petrol

Figure 2: Comparison of the Extracted Ion Chromatograms of 60% and 90% Evaporated Petrol, with that of Unknown Sample

All of the above findings increase the evidential value of finding significant volumes of fresh or slightly evaporated petrol on carpet products in motor vehicles. As only trace levels are generally found without good reason, this may indicate the intentional addition of petrol to the vehicle interior.

References

1. Jackowski JP. The Incidence of Ignitable Liquid Residues in Fire Debris as Determined by a Sensitive and Comprehensive Analytical Scheme. Journal of Forensic Science 1997; 42(5): 828-832
2. Stone IC and Lomonte MS. False Positives in Analysis of Fire Debris. The Fire and Arson Investigator 1984; Vol 34 No 3

INTERNATIONAL ASSOCIATION OF ARSON INVESTIGATORS

MEMBERSHIP APPLICATION

TO THE SECRETARY. _____ CHAPTER _____

ADDRESS _____

_____ STATE _____ POST CODE _____

(Refer to the list of State office bearers on page 3 for the appropriate address).

I hereby apply for membership of the _____ Chapter of the International Association of Arson Investigators Inc. in accordance with its constitution and By-laws and agree to be bound thereby. I attach the sum of A$ _____ in payment of Annual Dues ($_____) and Initiation Fee ($_____).

All information recorded in this application is hereby warranted to be true and correct.

1. NAME IN FULL _____ 2. DATE OF BIRTH _____
3. EMPLOYER _____ 4. POSITION _____
5. BUSINESS ADDRESS _____

   CITY/SUBURB _____ STATE _____ POST CODE _____
6. HOME ADDRESS _____

   CITY/SUBURB _____ STATE _____ POST CODE _____
7. PHONE (BUS) ( ) _____ FAX ( ) _____

   MOBILE ( ) _____ HOME ( ) _____
8. PLEASE LIST ANY FORMAL QUALIFICATIONS (DEGREES, DIPLOMAS, CERTIFICATES etc. WITH THE NAME OF THE ISSUING AUTHORITY AND THE YEAR OF QUALIFICATION.

   _____

   _____

   _____
9. MEMBERSHIP of OTHER ORGANISATIONS _____

   _____

   _____
10. HAVE YOU EVER BEEN CONVICTED of a CRIME? YES _____ NO _____
11. FULL CONVICTION DETAILS _____

    _____
12. ARE YOU A MEMBER OF THE INTERNATIONAL ASSOCIATION of the IAAI?

    _____ MEMBERSHIP No. _____
13. REFERENCES *(Name, address, phone number, occupation)*

    A _____

    _____

    B _____

    _____
14. RECOMMENDED by a MEMBER in GOOD STANDING

    SIGNATURE _____ DATE _____
15. APPLICANT'S SIGNATURE _____ DATE _____

Fires Caused by Lighting

By Philip Austin

(An essay prepared by the author, a year student in the subject Fire Investigation in the Forensic Science Degree at the University of Technology, Sydney)

One of the most common potential sources of fire ignition is the light globe. It must not be overlooked since light globes can become extremely hot objects.

Bulbs of low wattage generally do not produce enough heat for the surface temperature of the globe to become hot enough to ignite common combustible materials. As the wattage is increased (especially with bulbs in fittings that restrict ventilation), the, temperatures can build up to very high temperatures.

Potentially a large light bulb can start a fire if it is placed in contact with a suitable fuel. Even small light bulbs can generate enough heat to ignite paper, cloth, sawdust, etc., if they are buried or wrapped in insulating material. These events are very uncommon not due to the lack of temperature that is reached, but more due to the fact that the bulb must be in contact with something that is easily flammable, which rarely occurs. It has however been known to happen in places such as basements, storage rooms, and roofs.

The breakage of any bulb while lit, even low wattage ones introduces two additional sources of possible ignition.

i) The filaments of most globes can reach over 1500°C. As soon as oxygen contacts the filament the filament begins to burn and then breaks. Though the filament also begins to cool as soon as the circuit is interrupted by a failure of the filament, it will retain more than adequate heat to ignite any flammable vapours or liquids that comes in contact with the filament shortly after it breaks.

ii) In addition to the temperature of the filament, the brief arc (spark), produced by the filament on breaking, has the same risk of igniting any flammable gases or vapours in the vicinity.

In the rest of this essay I will discuss some of the different types of lighting, and the hazards they involve, as well as two case studies involving halogen torchiere lamps and halogen spotlights.

Incandescent Lighting

The most common form of domestic lighting is the incandescent light globe. It consists of a fine, coiled, tungsten filament that is raised to white heat by

passing an electric current through it.

The filament is held in place by two support posts which are insulated and supported by a glass base. The glass envelope of the globe retains an inert atmosphere around the tungsten filament so it does not burn. The gas used is often argon.

The temperature of the glass envelope normally reaches between 100^0C and 300^0 C, but temperatures can be greatly increased if the glass is being insulated, which reduces any heat loss.

The glass envelope temperature of high intensity lights, such as the incandescent spot lights will not necessarily be any higher than those of normal globes, although several shop and dance fires have been attributed to spot lights in contact with paper decorations.

The surface temperature of a bulb is generally not high enough to ignite cellulosic materials. It can however scorch small amounts of paper or fabric.

Larger quanitities of paper or cloth tend to have an insulating effect on a globe, leading to a significant increase in the surface temperature of the globe, resulting in ignition of the material.

If the globe is broken the filament will remain glowing for a few seconds, though in the presence of air the tungsten begins to form tungsten oxides that are generally yellow. It is possible for the hot filament to ignite material in contact with it, which is particularly significant in road accidents when spilled petrol can be ignited by the filament of a broken globe.

Fluorescent Lighting

Fluorescent lights consist of a sealed tube filled with mercury vapour at a low pressure, and has the internal part of the tube coated with a mixture of compounds which fluoresce in ultra-violet light. The circuit for fluorescent lights often has what is known as a "choke" present which helps in starting the light and helps to prevent a dangerous rise in voltage.

When we switch the lamp on, a starter circuit operates causing a voltage surge that has enough energy to begin a discharge in the mercury vapour of the fluorescent tube. The discharge results in the emission of light, particularly in the ultra-violet region. This ultra-violet light strikes the coating on the inside of the tube, which fluoresces, emitting visible light. This method of producing light from electricity, is extremely efficient.

Unlike incandescent lights, fluorescent lights do not produce much heat, and the surface temperature of the light is unlikely to exceed 6O"C, except in the area of the cathodes where the temperature may get as hot as 80°C. The most likely danger of fire, is that the choke can overheat. A number of fires have been

attributed to this cause.

Tungsten Halogen Lighting

A tungsten halogen lamp is different from a conventional inert gas-filled incandescent globe in that a halogen gas such as iodine or bromine is present at low partial pressure. The tungsten vapour which would normally be deposited on the inside of the globe, combines with the halogen to form volatile halides and the surface temperature of the globe is kept hot enough to prevent these halides from condensing.

The halides disassociate in the vicinity of the incandescent filament and a state of equilibrium is reached.

The globe envelopes for halogen lights are generally constructed of vitreous fused quartz or Vycor, which are able to withstand the high temperatures needed in these lights. The halogen globes are much smaller then incandescent globes. This means that the reduced volume of a tungsten-halogen lamp allows economic use of more expensive but much more effective gases such as krypton and xenon, instead of argon. The smaller size of the envelope also means that the globe has improved mechanical strength, and thus the gas in the globe can be present at a much higher pressure. This reduces evaporation and increases filament life.

Tungsten halogen bulbs operate with surface temperatures of the globe reaching 600-900°C.

Flammable materials in contact with a quartz globe at these temperatures are likely to ignite in a very short time.

As the tungsten halogen globes operate under such a high internal pressure, it possible for these globes to explode under certain circumstances.

Traces of sweat left on the quartz envelope can cause the bulb to fail, and some display lights need to be arranged within 5^0 of horizontal otherwise they may eventually shatter as a result of differential migration of the halide. Several fires in shop windows have been attributed to this effect.

Naked Flame Lighting

Though most lighting that we encounter is electrical, naked flame lights persist in certain applications. Most people have candles in case there are power cuts and for lighting at dinner parties or festivities such as birthdays. Oil lamps and pressurised butane lamps are used by campers and by householders where there is no electricity supply.

Though not frequently used, naked flame lights can cause fires by misuse. Few people now use candlesticks and as a result, when candles are used, they are stuck to saucers with wax or wedged into the necks of bottles. This can often lead to the candle becoming unstable and can

cause a fire by falling onto or against a flammable material.

Oil and pressurised lamps are generally designed with stability in mind, and when overturned are unlikely to cause fires.

One of the big dangers with naked flame lights are when they are placed close to or underneath a flammable object such as a curtain. At Christmas candles may be included into decorative arrangements which can include crepe paper and evergreen foliage. Few people today use candles to illuminate Christmas trees, but if a dry sprite tree is ignited at a low level, the rate at which the flame is spread up the tree is extremely fast.

It is possible to fill a kerosene lamp with an incorrect fuel such as methylated spirits or petrol, and this was the cause of many fires in the early part of the 20fh century. Now most people are familiar with the smell and properties of the liquids and such accidents are rare.

It is however, still possible to fit the wrong type of butane gas cartridge to a pressurized gas lamp. Several manufacturers market lamps designed to accept a particular cartridge. Some of the cartridges are gas released by operation of a valve, while others are pierced by a protruding blade inside a gas-tight rubber seating.

If the wrong type of cartridge is used or an acceptable cartridge is incorrectly fitted, a sudden release of butane can occur, resulting in a fire or explosion.

Case Studies

Case Studv 1 - Halogen Torchiere Lamps

Halogen torchiere lamps are freestanding lamps with a shallow bowl-shaped light fixture mounted on the top of a (i-foot pole and illuminated by a tubular halogen bulb.

The U.S. Consumer Product safety Commission (CPSC) is aware of at least 350 fires, 114 injuries and 14 deaths, and millions in property damage since 1992, involving halogen torchiere lamps. It is estimated that in the United States that there are approximately 40 million of the torchiere (or pole) lamps containing tubular halogen bulbs. The lamps first became available in 1963 and sales have grown significantly in the 1990's.

Tests conducted by the CPSC showed tubular halogen bulbs of 250, 300 and 500 watts, installed in torchiere lamps, could start a fire in nearby combustible material.
Incandescent bulbs of 75 and 150 watts bulbs operate at 120 and 170°C respectively. Tubular halogen bulbs in torchiere lamps of 300 and 500 watts, operate at 520 and 650°C respectively.

Halogen torchiere lamps have become extremely popular due to the fact they are cheap and give out a good strong fight. They are especially popular with students in dorm

rooms where there is often poor lighting, which is not sufficient for studying. In a study at Harvard University it was found that there was nearly one halogen torchiere lamp per student among Harvard's 2nd, 3rd and 4th year students. Average use was 39 hours per week. In many rooms, they were consuming more electricity then the refrigerator.

Tests were conducted in New York using a 300watt halogen torchiere lamp. It was found that when a piece of pine wood was placed on top of the lamp it ignited after 73 seconds. A piece of cardboard took 77 seconds, a paper air plane took 56 seconds and a t-shirt (80% polyester/20%cotton) burned through the two layers over the top of the lamp in only 24 seconds.

On July 2gth 1996, the Consumer Product Safety Commission issued a warning to consumers on the dangers of the torchiere-style halogen lights.

Underwriters Laboratories, an industry funded group which sets the voluntary safety standards for halogen floor lamps, has made the following recommendations.

1) They have issued a warning to manufacturers to stop selling the floor lamps with 500 watt halogen bulbs.
2) From February 1997 all halogen floor lamps will be required to carry a warning label attached to the power cord or other location visible during set up.
3) The initial warning to stop selling 500 watt halogen bulbs will be a requirement, and new lamps will be required to have glass bulb guards or a heat senstitive cut-off switch.

On August 21st 1997, the CPSC announced that together with the halogen lamp industry they were co-operatively recalling for in-home consumer repair, some 40-million halogen torchiere floor lamps. Consumers who own torchiere floor lamps without a glass or wire guard over the glass bulb can receive a free wire guard with installation instructions from certain retail stores.

The U.S. Consumer Product Safety Commission and Undewriters Laboratories have given the following safety tips for torchiere-style halogen lamps.

- Never allow torchiere halogen lamps to be placed where the tubular bulb could come in contact with curtains or other cloth window treatments.
- Never leave a torchiere halogen lamp on when you leave a room or are not at home.
- Never drape clothes over a torchiere halogen lamp.
- For torchiere halogen lamps equipped with a dimmer switch, set the lamp at a setting lower than the maximum whenever possible

- Keep halogen torchiere lamps away from elevated beds such as bunk beds where bedding may get too close to the tubular bulb.
- Place torchiere lamps in locations where they cannot be tipped over by children, pets, or a strong gust from an open window.
- Never touch halogen bulbs with bare fingers. The oils in your skin can cause "spots" on the glass envelope that may result in premature failure of the bulb.
- The lamps are required to use particle containment barriers to keep glass inside the lamp - this barrier should be in place at all times when the lamp is operational.

Case Study 2 - Fires Caused by Heat from Built- in Halogen Spots

Low-voltage halogen lighting is becoming very popular at home, in the office, and on the shop floor. The low-voltage lights can be bought in do-it-yourself packages and often lay people who thinks it looks easy, to try and install them themselves. This however can be extremely dangerous.

It has been found that if the halogen spots are installed in the ceiling, where the lights are covered by thermal insulation, enough heat can build up from the lights to ignite the insulation.

Lights installed in the ceiling must have a safety gap between the halogen spotlights and loose-fill insulation or ignition can easily occur. It is important that low-voltage halogen lighting should only be installed by experts in compliance with safety regulations.

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Arson: A Deadly Crime

Arson remains one America's most dangerous and costly threats for citizens and their property alike. The latest statistics from the National Fire Protection Association reveal more than 400 hundred Americans die, thousands more are seriously injured and an estimated $1.7 billion dollars in property is destroyed each year in arson fires. Arson burns without discriminating between the elderly or infants or between businesses, homes, churches or vacant buildings.

Just over a year ago a pair of firefighters entered a burning vacant warehouse in Worcester, Massachusetts to rescue two homeless people reportedly living there. A short time later each radioed they were lost in heavy smoke and were running out of air. Four more fighters rushed in to rescue them. All six died in the next few minutes.

What happened in Worcester stunned this nation and focused attention, once again, on the horrendous hazard of unsecured vacant buildings and fire. Anywhere an unsecured vacant building exists there is a very real danger another Worcester tragedy could occur.

We all know vacant buildings are the sites of serious crimes. In rundown neighborhoods, the poor and elderly have had first-hand experience with the depressing effect that dilapidated and abandoned buildings have on their neighborhood and how quickly such buildings become magnets for trash, dope dealers, rodents, the homeless, curious children and fire.

There are thousands of fires in vacant buildings each year in this country. Seventy percent of these fires are officially classified as suspicious or arson. To make matters worse, firefighters are three times more likely to be injured fighting fire in a vacant building as in an ordinary structure fire. Vacant, unsecured buildings are an unacceptable risk to people and property in this community.

Targeting vacant buildings for fire and arson prevention is the single most effective thing we can do to control the danger. This boils down to securing the building against illegal entry and clearing combustibles from its perimeter and porches. Properly secured, any value the building has is preserved for redevelopment and protected against inevitable damage by vandals, the weather and arsonists.

Alert your elected officials and your local fire and police department to unsecured vacant buildings in your neighborhood.

Report any suspicious activity in and around these structures promptly.

Community leaders must address the most hazardous buildings first. They should require property owners to comply with sensible fire and sanitary codes and use the civil and criminal laws and penalties along with public and private redevelopment funding to expedite control of blight and ultimately to stop building abandonment.

The price for doing nothing is enormous. More than half a million fires were deliberately set in America last year, and over half of those fires were set by youngsters and juveniles under the age of 18. Vacant buildings played a major role in this epidemic.

Gerard Naylis, President of the International Association of Arson Investigators and Tommy Short, President of the International Association of Special Investigation Units, have said "The lives and property lost as a result of arson needlessly reduces the quality of life for everyone. The diligence and hard work of both public and private investigators towards the identification and reduction of arson should be recognized and supported by everyone."

The most effective way of combating arson is the same method used to control crime - prevention. If you are living or working near a dangerous vacant building report this problem to your mayor's office, building and code department and the fire department.

Support the Neighborhood Watch program.

Remember, Arson Stops With You!