

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

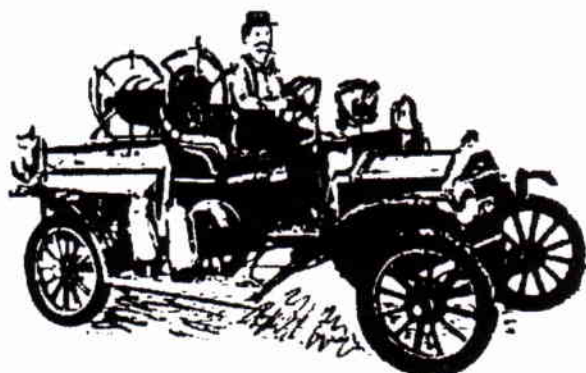
The Federal Government has announced that it will provide subsidies to home owners installing roof insulation.

The most commonly available materials for such insulation are fibre glass batts or cellulose fibres.

Fibre glass batts have been criticized as dangerous to health, particularly if breathed in. Cellulose fibre materials have possible dangers associated with fires.

In this issue we feature two timely articles on the possible fire dangers associated with cellulose fibres.

Wal Stern



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VICTORIAN BUSHFIRES

The February Victorian bushfires have shocked the entire nation. The scale of the loss of life has stunned us all. The thought that some of the fires have been deliberately lit has appalled us.

The devastation to human and animal life, to property and to vegetation seems unparalleled in our nation. We are all terribly saddened. The loss of life of a firefighter weeks after the main blaze adds to the tragedy.

Many of our members have been involved. Personally in the fires, as fire fighters and as investigators. It is a terrible time for many.

We will need to think again and learn. These fires occurred because

of a particular set of circumstances. Years of drought, ultra dry vegetation, high temperatures, humidity, and high winds. The worst of all worlds come together.

Should people stay or leave under these circumstances. We will need to rethink this vexed question. Burns expert Fiona Woods had no doubt on this matter. She had seen victims. Lives were more important than goods and property. Get out early. Others declared they could save property and lives if properly prepared.

And what type of structures are needed in bush areas? Do they need to contain concrete bunkers? Can we live in these locations?

How about land clearing? And burning off? These topics need to be re-visited in the light of the evidence we glean from these fires. Will climate change force upon us more events of this nature?

What the fires have already done is pull the nation together. The outpourings of feelings, and the response for calls for help, have been heartfelt and massive.

We are all in sympathy with those who have lost loved ones, homes and possessions. We want to help in a practical way.

We must learn from this tragedy, and seek to avoid a recurrence.

Wal Stern
"Firepoint" Editor

Queensland Chapter

Presidents Report: Brian Richardson

By the time this issue of "Firepoint" is published the QAFI will have held its annual general meeting and determined the new committee for 2009 as well as the special resolution proposal to vary the eligibility requirements for committee members (to enable a wider section of representation and participation on the committee).

I would like to take the opportunity in "Firepoint" to publicly thank all the QAFI 2008 committee members, and our secretariat service (Tony and Virginia) and honorary solicitor (Quentin) for their work and efforts in 2008.

A hard year of rebuilding and attention to detail was undertaken, and all major legal obligations that the association is required to abide by have been met. Functions and seminars have been presented for the benefit of members.

Response to our 2008 breakfast and one day

seminar (*Fire Scene Safety – are you at risk?*) was very good with encouraging feedback on the quality of the presentations made. Through the work of all the committee the QAFI is now in a healthy position and can grow in strength to benefit all members and those involved in fire investigation, fire prevention and associated industries.

I hope the members support the initiatives and activities of the 2009 committee and I look forward to more information sharing, training and networking opportunities between those involved in fire investigation and prevention in 2009.

2009 ANNUAL GENERAL MEETING & BREAKFAST FUNCTIONS

The QAFI held the 2009 annual general meeting on 26th February 2009.

Prior to the annual General Meeting, a

breakfast seminar on **Forensic Accounting – Fire Fraud Detection** was presented by Joseph Box - Director – Litigation & Forensic Consulting, Grant Thornton (QLD) Pty Ltd

UPCOMING EVENTS

The QAFI 2009 proposal is to have further breakfasts / half day seminars throughout the year and a major one or two day seminar. Further information relating to these functions will be published closer to the dates.



Cellulose Fibre Insulation (CFI).

Will it or will it not burn?

Roger Bucholtz

Abstract:

Cellulose fibre insulation (CFI) has been recognised, and used as, a very effective insulation material. The product is made from shredded cellulosic material, newspaper, with fire retardant chemicals added for safety reasons.

The product is advertised as fire resistant, and many tests have been conducted on CFI where this has proven to be correct.

However there have been occasions where the product has assisted in the spread, or put another way, not inhibited the spread, of fire.

This article demonstrates how a fire involving CFI destroyed the roof of a house.

The house:

The house was a single level brick veneer with tiled roof, and had three bedrooms, with a double garage, at one end of the building, all under the main roof. The house had ducted air conditioning throughout, down lights in each room, a back to base security system, and in the roof it contained sarking beneath the tiles as well as the newly installed CFI.

Pre fire activities:

The owners of the house had decided to have the premises insulated with CFI. Having researched the product the owner was confident that he had selected a product that offered excellent insulation characteristics, with no risk factors regarding fire and/or respiratory dangers.

On Saturday 17 October the CFI was pumped into, and spread around the ceiling, which is the approved method of installing the product. During the

installation process the installers had placed cardboard boxes around each down light, and then stapled the flaps of the boxes to the ceiling gyprock. The purpose of this is to ensure no CFI could come into contact with the down light, which could heat the material with the likelihood of a fire occurring.

During the weekend, one which was considered to have been affected by slight to moderate winds, the owner noticed pieces of CFI falling through the down lights and from the fan and light fitting in the bathroom. He contacted the installer to inform him of the problem, and the installer said he would be out Monday to check out the matter.

The fire:

The installer arrived early Monday 19th and was briefed by the owner re the problem; he then proceeded to gain entry to the roof by removing a few tiles to ascertain why the

material was moving about in the roof void. After removing a few tiles the installer put his head in the opening and thought he could smell smoke. He immediately returned to the ground. In the words of the owner:

"The installer came down the ladder, was stunned and unable to say much".

The owner went inside and in the kitchen he saw smoke coming from the air conditioning vents and a flame shoot out of the air intake grille. Within a few minutes of seeing this, which was immediately after the installer had removed a few roof tiles, fire was quickly spreading in the roof.

The fire was contained to the roof area, with secondary fire damage to furniture items in various rooms.

Investigation:

During the investigation it was observed the major fire damage occurred to the southern section of the roof, more predominately over the garage, with the secondary fire damage due to drop down.

Indicators that became evident as the investigation proceeded were;

Ceiling joists charred on their top edges,

Roofing timbers severely charred, especially above garage;

No severe fire damage in rooms;

Smoke staining around down lights indicated location of boxes.

A combustion heater located in front room had no fire or heat patterns around it, nor was any damage to nearby timbers.

It was determined that the area of origin was in the roof void above the garage. Whilst sifting through this area looking for a heat source a small transformer was located on the gyprock approx. 2 metres from a man hole opening.

The transformer was identified as the step down transformer for the back to base security system in the premises.

The installer of the security system was contacted and he was adamant that the transformer will not burn, but will generate heat, and therefore it is not to be covered with any material, but had to have air circulating around it.

A re-examination of the area of origin determined that no protection had been provided around the transformer, thus

allowing the CFI to cover the unit when the CFI was pumped into the ceiling.

Cause determination:

There being no other heat source in the area of origin the cause was recorded as *"CFI overheating around a security system transformer."*

It was considered that most probably the fire had been smouldering in the roof for a period of time over the weekend, and then when the CFI installer removed the tiles to inspect the problem of the CFI falling through the down lights and bathroom fan and lights, the inrush of air caused the smouldering material to ignite.

NOTE: This fire occurred more than 10 years ago so it is possible that many changes have been made to the way CFI is now fire retardant treated, and the installation processes may have changed.

Has anyone had recent examples of CFI causing fires?

Victorian Association of Fire Investigators Inc.

Website www.vicfire.com

VICTORIAN CHAPTER

To all members across Australia, Victoria has had an unprecedented fire disaster at which all of the committee and members of this Chapter have been involved in investigations, searching for bodies, fighting the fires and supporting the Fire Agencies.

I should note that there are some areas still burning at the moment of writing and several areas that are still crime scenes or still too dangerous to enter making the final completion still some weeks away.

I wish to thank all those of you who have sent their best wishes to individuals, unfortunately we are all still under pressure with this and the day to day work and may not have replied.

Due to the commitment and workload of the committee, training sessions have been planned but dates are still to be confirmed.

The committee recommend to all members to check the website for up coming events.

As time allows we will hopefully produce some interesting articles regarding our deployment to the fires.

VICTORIAN MEMBERSHIP

Fees Just a reminder that fees for 2008/2009 are now due and if any member has any enquires regarding membership contact Alex Conway 9420 3883.

The Chapter has at this time 150 financial members with

renewals and new membership still arriving.

VAFI Scholarship for 2009/2010 is open for applications by financial members and will close 31st May 2009. All details are located on the VAFI website.

TRAINING

March/April 2009
Legal & New
Coroners Act
Presentation

May/June 2009
Collecting & Selecting
Samples

July/August 2009
Electrical/Gas Fires

October/November
2009
One day Session
including AGM

These training days will be advertised on the website and by Flyer to members.



**NSW ASSOCIATION OF FIRE
INVESTIGATORS INC**
(IAAI CHAPTER No.47)

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President's Report

Welcome back to our latest edition of Firepoint which comes to you shortly after the devastating affect that we have all witnessed in relation to the bushfires which claimed so many lives, destroyed so many properties and impacted upon the nation.

At the same time, we also communicate the heartfelt condolences, to all of the families that have been so tragically affected which could also include the extended families to the fire brigades and emergency services personnel who attended.

On a local level, one of our own members and a member of the Gilmour Brigade in the ACT, Dave Balfour was

tragically killed in fighting the fires in Marysville in Victoria, whilst connecting

a hose to his strike team's tanker.

Val Ansett, our former Treasurer was kind enough to forward information regarding Dave's death to us along with details of the Trust Fund which has now been set up by the ACT branch of the United Fire Fighters Union to assist Dave's family. For those of you who may be able to assist, those details are the following;

Account Name: Public
Trustee Common Fund
BSB: 062920
Account Number:
10036944

The reference in regard to any donations to that trust is in the name **Balfour** or use the number **139461** when depositing funds. The information provided to us encourages the use of electronic funds transfer with the above details.

Further to the meeting of the Chapter representatives from Queensland, Victoria, New South Wales and New Zealand, a decision has been made to run a National Conference in 2010. At this stage, the conference committee has been formed by representatives nominated to put together the conference which appears likely to be held in an eastern states of Australia on this first occasion.

More information regarding that development will come in due course. I would encourage all of us in conscious of the National Conference next year and be promoting not only membership to our Chapter, but also support of the conference on a national level in 2010 and continued support of the chapters at a local level. The idea of a National body however was not supported at this stage.

Coming out of a that meeting we heard that the Victorian Chapter had been very supportive of their membership in what was identified as being a 'travelling road show' where they took training information to people in more remote areas.

That was reported back to our own committee who have now decided that would be advantageous for our members. We therefore are implementing local education evenings for presentations with the first occurring in April 2009 in the ACT.

We hope that this will receive support of all of the industries involved in fire investigation and in particular those people involved in the ACT and NSW country region. Personally, I can see that it may be also advantageous for us to consider taking similar presentations to areas along the rural and coastal areas of New South Wales as membership and facilities along with resources are available.

This of course will also be heavily determined by the support of members and organisations in those areas.

Our first education night for 2009 will see myself presenting on changes to the SAA Wiring Rules. Rather than being a

particularly technical matter involving electrical wiring installation, the changes to the wiring rules will impact on fire investigation, particularly since the implementation of the new rule book in July 2008.

The publication which is used to set up the Australian and New Zealand standard for electrical installations has now been revised and it written predominately in two sections. Those sections deal with safety concerns and prescriptive methods of installation. These matters may have no particular significance in any criminal act in relation to a deliberately lit fire, however in the event of an accidental fire, larger concerns are now identified giving the value of any loss with potential recovery action that may be taken against a third party, for example, an electrical contracting firm, and the requirements that the electrical contractors need to comply with the regulations and how the installation is wired.

Accidental fires and electrical determinations have just taken on a whole new look.

Fire fighters and police officers will need to know what those changes are in order to identify any aspect of the change which may be relevant in an

accidental fire determination. These matters may see insurance companies seek recovery of their financial losses in the event of a claim which will reflect on the findings of police and fire officers along with private fire examiners and in particular, the way a scene is maintained or altered.

I look forward to seeing you where we can discuss those issues that evening.

Might I also mention the contribution of Inspector Gary Malpass of the New South Wales Fire Brigade F.I.R.U, who has recently retired. I was fortunate enough to attend Gary's retirement function and wish him and his family all the best for their future and the lowering of his golf handicap. If any of you have information that you would like to discuss or topics that you would like to see covered by our Association on education nights or in future conferences, please contact us and we will do our best to consider each and every application.

Stay Safe

Kind regards

Greg Kelly
President



Back row left to right: Michael Chopping (President, NZ) , Gary Nash (Treasurer, QLD), Andrew Lundy (Comm QLD), Andrew Kerr (President, VIC), Greg Kelly (President, NSW)

Front Row: Mark Pollard (VP, NSW), Brian Richardson (President, QLD), Brian Neal (VP, VIC)

This photo is of the representatives meeting to consider a National Conference and National Body in Queensland on the 26 November 2008.

The meeting was overall very supportive of an Australasian National Conference being held possibly every two years, the first one to be held in 2010. Each of the Chapters were to go back and discuss with their committees the matters discussed with a view to moving ahead to the organisation of the conference. It is anticipated that each chapter will have representation on the organising committee with preference at this stage for the event to take place in Sydney or Melbourne due to travel, location etc for ease of attendees.

The meeting did not go ahead with the formation of a National Body at this time.

Cellulose Insulation and down lights – A ticking time bomb

*NSW Fire Brigades Senior Fire
Fighter Leonard Juffermans*

Introduction

Cellulose Fibre Insulation Facts

Cellulose fibre has been used widely as an effective domestic insulation material both in Australia and overseas since the 1920's. As society moves to ever increasing perception of environmentally safe methods of construction, and home owners require affordability in there building materials cellulose fibre has become more popular and the market has grown considerably.

"The cellulose insulation manufacturers association quotes annual sales of cellulose ranging between 115 and 125 million dollars [for 2007]" (Carter T, 2008, p.1)

Cellulose fibre used for insulation purposes is very easy to manufacture and the raw material, recycled newspapers, is very inexpensive. The equipment to blow it in is also very inexpensive and installation is easily achieved requiring only a blowing device and an access point to the roof cavity.

"Cellulose fibre insulation is made from either pure cellulose waste, derived from paper production or

from shredded newsprint. The product consists of small tufts of

paper, dry mixed with powdered chemical additives which improve the fire properties of the product and prevent mould growth.

These are frequently mixtures of borates or boric acid; cheaper alternatives such as aluminium and ammonium sulphate are sometimes used. Typically it has a fluffy appearance and a greyish colour" (Eurima, 2004, p.1)

Cellulose fibre insulation is made from approximately 80% fibre and approximately 20% by weight of fire retardant chemicals which are thought to be well dispersed within the product. (Eurima, 2004, p.1)

But there have always been concerns both within the construction and building industries and in more recent years the fire safety sectors regarding the potentially flammable nature of what is an essentially a organic product. "Ever since cellulose insulation was first marketed in the 1920's sellers of competing products have raised questions about the safety of the material. These questions are based on legitimate concerns. Cellulose insulation is an organic material. Without special processing organic material will burn." (R-TEK Insulation, 2004, p. 1)

Cellulose Fibre Insulation and the Manufactures View

The fire safety properties of cellulose fibre insulation are excellent, or so the manufacturers would have us believe, and it is not difficult so see that their view is essentially biased: "Because it's an organic material, cellulose is treated with fire retardant. It is the only common wood fibre based residential and light commercial construction material that always receives such treatment. This process makes cellulose insulation one of the safest construction materials on the Australian Market." (Cellulose Fire insulation, 2007, p. 1)

"... demonstration burns have proven that the dense fibre structure of fire retardant cellulose actually slows the spread of fire, protecting ceiling joists and plaster from the spread of fire. This results in a fire being contained at its ignition point thus preventing further damage." (Natrancel Insulations, pp.1)

A demonstration frequently used by sales representatives of cellulose fibre insulation within Australia throughout the 1990's was to don a standard leather 'riggers' glove on the Left hand. This was then dipped in a viscous solution and a layer of cellulose applied. To prove the fire retardant and insulation properties a naked flame was then applied to the cellulose covered hand – with predictable results – no apparent pain from thermal energy and the absence of ignition. The demonstration although visually effective lacked any scientific credibility.

Cellulose Fibre Insulation and Fire Safety

"The literature and market place is beset with contradictory claims

Fire test AS1530.3 is currently in widespread use in Australia to assess early fire hazard of materials used under the Australian Building Code in domestic and commercial buildings. However due to claims of anomalous results and inappropriate test materials AS 1530.3 is currently under revision.

"Use of AS1530.3 in the building code will probably be supplemented by other fire test methods such as ASTM E970 'Attic Radiant Panel Test' for ceiling insulation and BS476.7 'Radiant Panel Test'." (Ansems, 2008, p.4). These further tests can then give a more accurate performance rating of cellulose fibre fire safety.

"Cellulose fibre insulation is combustible in accordance with BS476 Part 4. "In Australia seven field research projects to determine the extent of compliance to fire safety regulations indicated a 55% failure rate for cellulose fibre insulation." (Carter T, 2008, p.5)

In addition to this, for cellulose fibre, largely as a result of the NSW Dept of Consumer Affairs Product Safety Enquiry (1992) the ASTM C 739 and BS5803.4 'smouldering/inclined radiant fire panel tests' are mooted to replace AS1530.3 in the current revision of cellulose fibre loose fill insulation. (Ansems, 2008, p.3)

Cellulose Fibre Insulation and Behaviour when Exposed to Radiant Heat Sources

Cellulose fibre insulation and the probability of the occurrence of ignition and subsequent incipient smouldering fire has a direct and clear correlation to its contact with points in a roof cavity that can act as sources of heat that include lights, down lights, chimney flues and electric fans. "The radiant heat output of a source goes up in proportion to its temperature raised to the forth power (T^4). So the hotter it is, the much higher the heat output is." (DeHaan, 2007, p. 1)

DeHaan further states "For a solid to be ignited by an external source, enough heat has to be transferred to it so that its surface temperature reaches its ignition temperature. "Another factor that must be considered is the duration of the ignition source. Ignition requires not only enough heat in the source but enough contact and prolonged enough contact between fuel and source, so that adequate energy is transferred." (DeHaan, 2007, p. 1)

"Most fires start from one of two causes: the spontaneous combustion of pyrophoric carbon formed when insulation, the mounting surface or building materials adjacent to the fittings dry out from excessive temperatures; or the overheating of wiring connections or transformers when they to are covered and trap excessive heat." (Electrolink, 2005, p.5)

A review of fire incident data in the U.S. revealed that greater than 80% of fires associated with insulation involved cellulose fibre insulation, and were started by overheated electrical light fixtures, other electrical sources, and heated flues. Similar results were shown in Australia and other American studies. In Norway, other studies have shown that localised heat sources including 100 watt light bulbs caused smouldering. (Eurima, 2004, p.3)

Cellulose Fibre Insulation and the Dangers of Down Lights

"With incandescent lamp holders operating at 210 degrees Celsius and halogen lamp holders at 350 degrees Celsius, particular care has to go into the fitting design to make sure lamp holders are not exposed to the ceiling cavity." (Electrolink, 2005, p. 5)

The problem arises that when various fittings were tested the "... 'heat cans' frequently exceeded the 90 degree Celsius temperature limits by 20 – 50 degrees Celsius once the building insulation is butted up to them." (Electrolink, 2005, p. 5)

"Tungsten halogen bulbs operate with surface temperatures reaching 600 – 900 degrees C. Flammable materials in contact with the globe at these temperatures are likely to ignite in a very short time." (Philip, 2000, p.4) 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 spot lights and loose fill insulation. (Philip, 2000, p.8)

In addition to the dangers of combining a heat producing down lights with incorrectly installed loose fill cellulose insulation, the installation of down lights also introduces another fire safety concern.

It is "...recognised that cutting a hole in a fire rated ceiling presents a potentially serious safety hazard. The fire rating of the ceiling is seriously compromised by the hole. Flames and smoke would naturally find ingress in the gaps between the down light and the ceiling, escaping up into the ceiling void and to the floor above far faster. The ceiling could not then perform to its given safety standard." (Malcolm, 2005, p. 1)

Cellulose Fibre Insulation fires and Extinguishment

As cellulose insulation fires occur to a large degree by insidious combustion their apparent detection can be frustrating and difficult. NSW Fire Brigades Fire Investigator Inspector Chris Sedgwick has recalled numerous cases of cellulose fire insulation in which the fire has appeared to have 'tunnelled' under the surrounding material leaving no mark or sign of its destruction on the surface material. In addition to this due to the slow moving nature of a smouldering fire the spread can go unnoticed by occupants

with the distinct smell of smoke being the only indicator. (Sedgwick, 2008, Pers Comms)

DeHaan concurs with the slow rate of travel of smouldering fires stating "...combustion rates for smouldering are on the order of 0.1mm/sec where flame spread rates can be 10mm/sec" (2007, p. 7)

With this in mind it should be noted that when investigating a call to a structure with cellulose fibre insulation a thermal imaging camera serves as an indispensable tool that can give an accurate idea on the location and size of fires within the ceiling cavity.

Once located the successful extinguishment of cellulose ceiling fire is difficult, dangerous and potentially time consuming. A smouldering cellulose fire gives off large volumes of carbon dioxide (CO₂) and carbon monoxide (CO) so breathing apparatus is essential, crews will have to work in confined spaces in ceiling voids, there is the danger of ceiling collapse or fire fighters inadvertently stepping on unsupported ceiling areas with subsequent falls, communication is hampered, visibility is likely to be nil and heat levels will be high due to the presence of fire and the confined space causing increased fatigue.

Some sources suggest the only way to extinguish the cellulose successfully after the occurrence of a smouldering fire is to flood the sample with water and stir it in essentially producing a slurry. This method has obvious drawbacks as cellulose fibre is hygroscopic and contact with any water source

causes rapid absorption, which in turn causes a dramatic increase in weight which in turn poses a very real danger of ceiling collapse, and increased damage to the whole structure.

Another method used and suggested by NSW Inspector Mick Gibson is to send rotating crews into the ceiling cavity of the building in SCABA and initiate complete removal of the product. "But this method has severe draw backs with the need for frequent crew rotation and high numbers personnel due to fire fighter fatigue and exhaustion, crews with the ability to work effectively in confined spaces, the increased chance of accidents and mistakes and essential logistical support from BA/HAZMAT and Communications." (Gibson, 2008, Pers Comms)

Conclusion

Cellulose is a natural organic material and when it is used for domestic insulation it is usually impregnated with fire retardant chemicals most usually boric salts, but over time (evidence suggests 5 – 10 years) these chemical additives rapidly lose their effectiveness which is further enhanced by close proximity to 'low risk' thermal output of approximately 149 degrees Celsius which results in a substance that is both easily ignitable and very difficult to extinguish, and when ignition does occur it usually results in a long burning smouldering fire that can have potentially devastating effects.

When recessed halogen down lights are installed in a structure with cellulose fibre insulation, high amounts of thermal energy are released over long time periods which is enough to cause ignition via radiation. If the cellulose is aged the probability increases further and if there are incorrectly fitted or missing heat shields and the cellulose material has been 'blown in' during installation so that down light holders are covered a fire is almost a foregone conclusion.

Cellulose by its self can present a danger, when it is given a contact with external heat sources it does present a clear and present fire hazard.

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