FORM 39

Rule 61(1)

FINDING INTO FIRE WITH INQUEST

*Section 68 of the **Coroners Act 2008***

Court reference: 4864/07

Inquest into the fire at 'Japanese Screens and Interiors', 17 Hall Street, Yarraville 3013

Delivered On:	23 August 2010
Delivered At:	Hearing Room, Level 1/436 Lonsdale Street, Melbourne 3000
Hearing Dates:	Directions Hearing 11 September 2009 and Inquest 19 April 2010
Findings of:	HEATHER SPOONER
Representation:	Ms Sarah Hinchley for Metropolitan and Emergency Services Board
Police Coronial Support Unit:	Acting/Senior Sergeant David Dimsey

FORM 39

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In the Coroners Court of Victoria at Melbourne

I HEATHER SPOONER, Coroner, having investigated the fire of Japanese Screens and Interiors,

Details of fire:

Location of fire:	17 Hall Street, Yarraville, Victoria 3013
Date of fire:	12th October, 2007

AND having held an inquest in relation to this fire on 19 April 2010
at the Coroners Court of Victoria at Melbourne find that the cause and origin of the fire was:

An exothermic chemical reaction in or about a spray booth in the polish room of Japanese Screens and Interiors situated at Factory 3, 17 Hall Street, Yarraville.

In the following circumstances:

1. On 12 October 2007 a fire occurred at Japanese Screens and Interiors. It was due to an exothermic chemical reaction and spontaneous combustion of lacquer containing nitrocellulose. A firefighter, Richard Zapart, was critically injured.

2. A subsequent application on behalf of the United Firefighters Union pursuant to s.32(1) and s.35(1) *Coroners Act 1985* seeking an investigation and inquest into the fire was granted. An Inquest Directions Hearing on 11 September 2009 and an Inquest on 19 April 2010 proceeded pursuant to the provisions of the *Coroners Act 1985*.

3. On 1 December 2008 the Governor of Victoria assented to the **Coroners Act 2008**. On 1 November 2009 it came into operation. These inquest findings are deemed to be made under s.68 **Coroners Act 2008** having regard to the transitional provisions set out in s.7 of Schedule 1 of the new Act.

Investigations

4. A police investigation was conducted, initially involving the Arson and Explosives Squad. There was also a concurrent investigation by the Metropolitan Fire and Emergency Services

Board (MFB). Two safety management meetings were convened on 7 December 2009 and 22 February 2010.

This finding does not summarise all the meetings and investigations, particularly the extremely detailed and thorough investigation of the MFB, but it is based on the material and evidence together with the Directions Hearing and Inquest transcripts.

Brief Circumstances Surrounding the Fire

5. The Factory 3 at 17 Hall Street Yarraville was leased to 'Japanese Screens and Interiors'. The business included the manufacture and polishing of Japanese style rice paper screens that were spray painted in a spray booth within the polish room on site. Quantities of lacquer containing nitrocellulose and other flammable materials were stored on site for spray painting. There were no external warning signs or HAZCHEM (Hazardous Chemicals) placarding.

6. Sometime after 8.00am on 12 October 2007 smouldering dust was observed in the back of an extraction fan in the spray booth. Efforts by the factory workers to extinguish proved futile and emergency services were notified.

7. At about 8.40am pumpers were despatched from Spotswood, Newport and Footscray for a chemical fire. Attempts were made to identify the nature of the chemical involved. Four fire fighters, Leading Firefighters (LFF) Zapart, O'Connell, Johnson and Fincher wearing full personal protective equipment (PPE) and self contained breathing apparatus (SCUBA), entered the factory and tried to locate the source of the fire. They reported a *'misty type of smoke or dust haze'* but no fire.

8. The fire fighters subsequently re-entered the polish room where visibility had deteriorated. They were unaware of the spray booth in the corner of the polish room and the chemical contents it contained. A glow was observed and a small flickering flame prior to a rapid flash of light and intense heat followed by flames and fire.

9. Three fire fighters safely evacuated the polish room before realising that LFF Zapart was still inside. The door to the polish room had slammed closed, and without hesitation, and despite the intense heat and flames, the firefighters courageously forced their way back inside. LFF Zapart was located on the floor of the polish room before being dragged outside where emergency treatment was administered. He was admitted to the Alfred Hospital with life threatening burns.

10. At the Directions Hearing Mr Peter Marshall, the Secretary of the United Firefighters Union, detailed some of the extensive injuries that Mr Zapart had sustained and the devastating impact they had on his life. It was apparent that the incident also had a deep impact on all firefighters.

11. The factory was extensively damaged by the fire.

Evidence at Inquest

12. Several witnesses gave evidence at the Inquest that was convened on 19 April 2010. They confirmed statements and interviews, some with amendment.

13. **Mr Mark Stewart** operated the business 'Japanese Screens and Interiors'. He provided a report and indicated his awareness that his furniture spray lacquers contained nitrocellulose. During the course of his evidence he explained the process of sanding back the screens in the polish room in between spraying them in the spray booth with lacquer which resulted in a build up of lacquer dust and over spray on the factory floor and the sides of the spray booth. When asked whether the work areas were regularly cleaned he replied, *'...pretty much so, yeah ... it used to happen on a regular basis...'* He agreed that sweeping, blowing and high pressure air might be appropriate and maintained that the extraction fan system *'...was operating exactly the same way it was when it was installed...'* He did not consider it was his responsibility to replace filters in the spray booth extraction system which had apparently been removed but otherwise *'...captures the overspray... You need to clean this out frequently as it builds up into quite a dusty form and also the booth loses its effectiveness and its usage so you need to blow that down with compressed air and from time to time you need to change those pads'.* Mr Stewart indicated that the factory had four 20 litre drums of lacquer delivered every week. There was no placarding outside the factory, *'...I don't think there is a requirement for that...'*

14. **Mr Arthur Kartsanis** was employed as a spray painter and was aware that nitrocellulose was a highly flammable component of the lacquer he worked with. He indicated that on the day of the fire he had observed smouldering on the dust on the floor of the spray booth. He stated, *'...we only used to get ten minutes to clean up. Ten minutes doesn't even give me enough time to clean the gun, spray gun.... I saw dust on the back of the extraction fan smouldering.... it was at the front of the grilles (arrestor pads.... fibre glass filters, that's what they are)... I've only seen it smoulder and eventually it's gotten worse and underneath the drums got smouldered as well so I had to run the drum out.'* When asked if the filters were on this particular day he couldn't recall. He agreed that he had told fire investigators about poor housekeeping and the presence of a build up of overspray. Mr Kartsanis indicated that although he wasn't provided any training regarding the cleaning/replacement of the filters he believed it was just *'common sense'.* During the 18 months he had been working Mr Kartsanis had given the fan a thorough clean on a *'couple of occasions'* and *'occasionally Mark used to come out there with his vacuum cleaner and vacuum it out...'* He dealt with the smouldering by using a fire extinguisher and kettle. The fire hose wasn't retrieved as it was padlocked and a garden hose was too short. There had been *'no fire training or fire safety plan to combat this type of fire...'*

15. **Mr Trenton Castle** was a cabinet maker and unofficial foreman working in the manufacturing area of the factory. He did not supervise Mr Kartsanis and had not seen the seat of the fire, only the smoke. He had no knowledge about the lacquers used in the spray painting process and had no fire or fire drill training. As for the cleaning he stated, *'you know like Arthur has said, ten minutes every day doesn't give you much time to clean 500 square metres, you know, sweep the factory. You need at least an hour or two to do that....'* In concluding his evidence he told the court , *'....I believe the drum that was brought into the factory was on fire or smouldering, that was caked, caked in overspray, and the other drums that were in that area were similar.... '*

16. **Mr Mitchell Rookes** was the timber sander and he had an awareness of the danger and flammability of the lacquer. He had only worked at the business four months when the incident occurred and had received neither induction nor fire training. He agreed with other witnesses evidence about the large level of overspray and the limited clean up time.

17. **Leading Firefighter O'Connell** told the court that the initial turn out was in regard to a chemical fire within a building and despite further inquiries enroute they were informed that the owner knew nothing more. Although aware upon arrival that it was a furniture business he did not know the type of products that might be stored on the premises. He had attended various factory fires in the past but never one involving the accelerant nitrocellulose. Mr O'Connell highlighted their lack of awareness upon arrival of the spray painting being performed at the premises and *'....that was I guess a part of the cause of confusion as to what were dealing with and there was no mention of a drum being taken out of the room. ....'*

18. **Leading Firefighter Fincher** also referred to the poor visibility in what he later discovered was the polish room. *'...The only thing I really noticed was the orange haze...'* and he had never experienced anything like that or the subsequent flashover that occurred.

19. **Leading Firefighter Fowler** was working with the Fire Investigation Analysis unit at the time of the incident. He referred to his report which noted no fire alarms or sprinklers. He commented that a Council inspection just weeks before the fire had recommended removal of the padlock for the installed 'Millcock' and hose however he noted that *'...the big issue with these cabinets is vandalism and a lot of the premises put a padlock on them so they cant be vandalised which is detrimental to the reason that they are there...'* Regarding the need for external HAZCHEM placarding he stated: *'...The regulations state that its placard level is 500 litres. The evidence we found it was probably on the cusp of that 500 litres so technically there should have been a HAZCHEM placard on the outer perimeter of the building, indicating to fire crews and other emergency services that there is flammables or other chemicals held inside the building. But there was no evidence on the external section of the building that it was there. There was what staff have said, a cabinet at the back wall of the building. The doors were open and these cabinets have a self closing system when you open the door and remove something the doors*

automatically close. These had been propped open or the springs had been removed ...' In regard to the housekeeping, he stated *'... there was evidence of wood shavings and sawdust on the floor after the fire which indicates that there is or was a large amount of debris and dust from the timber in the workshop... they indicated that there was a lot of sawdust and dust present in the building ...'* Mr Fowler commented on the limitations of the spray booth it being a bit ad hoc, having grown disproportionately and noted that Mr Kartsarnis *'... was using trestles and empty lacquer drums as trestles to spray some of the items that he was asked to spray .. he would spray the items outside the spray booth because they were too large to put in ...'* In regard to the removal of the filters he stated *'...if the filters weren't in place then potentially the overspray would travel through the exhaust system and be found on the fan motors maybe, or the fan system of the spray booth... '*

20. **Senior Fire Officer Foletti** assumed the role of Incident Controller. He highlighted the speed of events and the difficulties he experienced trying to obtain accurate information about the nature of the fire. First he was advised it was a chemical fire and later he was told it was a woodshavings and sawdust fire. He told the court that he was third on the scene arriving about five minutes after two other trucks and fire crew. Initially after the first fire crew inspected the building it was thought that sawdust may have ignited. HAZCHEM signage was abscent and Mr Foletti told the court *'...so we had no reason to suspect that there was any considerable quantities of chemicals inside...'* Had they been aware that lacquers were kept on the premises he *'... would have ascertained from the occupiers as to what the actual content was, what the products were and as I stated before, I am 100% sure that all the fire officers on scene were looking for a fire in sawdust, nothing to do with potential chemicals...'* Mr Foletti had heard of nitrocellulose used in lacquers *'....I am aware of any exothermic reactions from chemicals mixing together .... but could say I've never been involved in a fire in that industry with those products before.'* Had he been aware of the potential of the hazardous material inside the building '...I would *not have detailed any people to go in there...'* Later in his evidence he stated, *'...Once the fire actually took hold I did do a recognisance of what I could see of the interior of the building and there was a lot of containers which in my opinion would have contained quantities of dangerous goods in an amount that I would have expected to see signage out the front to indicate its presence which would have allowed us to actually pursue further inquiries with the occupants as to what we were dealing with... '* Mr Foletti stated rather succinctly, *'....As a firefighter my role is to protect life and property. I have a charter to do that and one of the first group of people that I'm responsible for as an officer is the people that I work with as well as the public that we serve. But I certainly have an expectation that within the industry that if they expect us to help them in an emergency that they will have protocols and procedures in place which not only guarantee their health and safety but also look after the health and safety of people like myself... if there's a lesson out of this experience we can just educate people. Hopefully it's a win/win for the people that we are chartered for taking care of but also look after us as well.. .'*

21. **Commander Ian Hunter** co-authored the Fire Investigation Report into the incident. He quoted extensively and whilst referring to the cause and origin of the fire he stated in part *'... whilst the initial call was for a chemical fire, firefighters were confronted with a dusty or misty haze without any sign of heat, smoke or fire on arrival. Given this fact consideration was given to reasons why an apparently harmless atmosphere would suddenly ignite. These considerations were a dust explosion, a flashover or a chemical reaction..'* Both the possibilities of dust explosion and flashover were eliminated leaving only the chemical reaction. He went on:

> "In terms of chemical reaction the point of origin was deemed to be in the polish room where polish lacquers and other finishes were sprayed onto finished furniture products. Spray painting commonly involves the use of nitrocellulose based lacquers and other flammable materials. Nitrocellulose is used in lacquers and inks to either act as a dryer or as a finish on polished surfaces. One of the effects of nitrocellulose lacquers is that heat is generated as part of the drying process. In the case of nitrocellulose based lacquers care must be taken if the lacquer is applied or spilt in a thickness greater than three millimetres. This also applies to nitrocellulose overspray dust in and around spray painting booths. At a less than three millimetre thickness the heat build up is readily dissipated into the atmosphere but if this depth is exceeded the heat can be retained within the material. The heat build up produces brownish haze like fumes which are made of oxides of nitrogen which are the breakdown products of the nitrocellulose. Depending on the conditions this heat build up may continue for a number of seconds or up to 30 minutes or so before an exothermic chemical runaway reaction occurs which forces the temperature to rise to a level where either the nitrocellulose or some other combustible compound ignites. Aside from the haze and very localised heating there is no other indication that a fire is imminent. The firefighters when interviewed have said that they did not feel any heat inside the polish room and all they saw was a dusty misty haze. The spray painter who was working in the polish room prior to the incident has said that he was using a metal bin as a trestle to support furniture he was spraying when he saw fumes coming from the drum. He freely agrees that there was poor housekeeping in the polish room and there was a large build up of overspray throughout the polish room. He also advised that the filters in the spray booth exhaust extraction system had been removed. The filters are designed to trap overspray and keep the spraying environment dust free. Removal of the filters would result in overspray building up throughout the spray booth, associated flue system and polish room in general. The MFB has attended a number of fires involving spray booths with the most significant of these being Anton's Mouldings at Somerton, a $70,000 fire, Modern Line Furniture, Sunshine, $1 million and Whelan Cabinets, Clayton South, 400,000. At each of these fires poor housekeeping and a failure to maintain the spray booth exhaust extraction systems and filters clean and free of overspray build up was the single contributing factor to the cause of the fire. The fires at both Modern Line and Whelan Cabinets were witnessed to have started as a reaction within a build up overspray. The Anton's Mouldings fire resulted from a bearing on a

conveyor system heating a building up of overspray that had gathered around the bearing."

His conclusion was that *"... based on the above information and the exclusion of all other ignition sources I conclude that an uncontrolled exothermic chemical reaction occurred in the build up of overspray in and around the spray booth in the polish room. This resulted in a significant chemical flash fire that ignited the various oxides of nitrogen and the suspended airborne particles in the atmosphere that engulfed the firefighters and critically injured Leading Firefighter Zapart. The fire then spread throughout the building."*

In regard to whether signage relating to the presence of lacquers would have assisted the firefighting effort on this occasion Commander Hunter stated, *"...The purpose of the hazardous material and dangerous goods information signage and placarding is to do exactly that, is to at least trigger in fire fighters minds or any emergency personnel that there is some form or quantity of dangerous materials in that building. ... I cannot say that it fitted the category for placarding .... but if it had been signage, you know, placarded with the appropriate signage it would certainly have triggered a response from the firefighters attending."*

Commander Hunter was aware that the Education and Training Department were developing a training package utilising the events and lessons of this fire (a draft case study) to increase awareness among MFB fire fighters.

In regard to the personal protection equipment for fire fighters that was very much highlighted by this fire, Commander Hunter understood that there were two remaining items outstanding being the selection of a new helmet and glove. He understood that there had already been a 100% rollout of new tunics, trousers and boots.

Finally Commander Hunter emphasized the bravery of the firefighters involved in this incident: *"...You need to understand that when this atmosphere lit up it lit up the entire factory and I think it is appropriate that the court is made aware of the fact that three firefighters were also engulfed in flames as they were trying to escape and put their lives on the line to go back in through the fire to rescue their colleague and I would like the court to recognise that, please"*

MFB Investigation Report

22. This extraordinary fire highlighted several major fire fighting safety issues and they were comprehensively canvassed by the MFB in their Investigation Report which formed part of the coronial file.[1]

[1] Since the **Coroners Act 2008** became operational, access to the coronial file may be sought pursuant to section 115 of the Act.

Safety Management Meetings

23. Two safety Management meetings were convened by the Coroner following discussions at the Directions Hearing. The purpose of the meetings was to raise awareness of the dangers associated with products containing nitrocellulose and to develop an overall safety management plan.

These meetings were widely attended by those involved in firefighting, fire safety and related industries including representatives from Worksafe Victoria, Metropolitan Fire and Emergency Services Board (MFB), Country Fire Authority(CFA), United Firefighters Union, Furniture Industry Association of Australia, Municipal Association of Victoria and the Office of the Emergency Services Commissioner. Their willing participation and expert input was very much appreciated as was the able co-ordination of the Coroners Prevention Unit (CPU)[2] and Sergeant Dimsey.

Several strategies were discussed at these meetings and submissions provided. The CPU assisted in collating this material and translating it into an agreed Safety Management Plan for Nitrocellulose Products in Victoria (attached and marked with the letter 'A').

Findings

24. This fire has highlighted the inherently dangerous nature of firefighting and the particular risks posed to both firefighters and the community from chemical fires involving products containing nitrocellulose.

25. I accept the conclusions of the MFB investigation and find that this fire was caused by an exothermic chemical reaction and the spontaneous combustion of a spray painting lacquer product containing nitrocellulose.

26. I find that the fire originated in or about the spray painting booth of the polish room at Factory 3/17 Hall Street Yarraville.

27. I find that poor housekeeping and maintenance led to a dangerous accumulation of lacquer overspray and nitrocellulose dust which provided the perfect conditions for the heat build up and exothermic chemical reaction to occur. Although the business operator tended to minimise any cleaning/maintenance shortcomings, I preferred the evidence of the workers who indicated otherwise.

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2 The Coroners Prevention Unit is a specialist service for coroners created to strengthen their prevention role and provide them with professional assistance on issues pertaining to public heath and safety.

28. I find that the absence of any external warning signs or placarding left the firefighters severely compromised and exposed them to an unacceptable level of danger. Although I am unable to find whether the chemicals held on site were of a quantity that required external HAZCHEM placarding, it is apparent that some form of external warning sign would have assisted in determining the appropriate firefighting response.

29. I find that although the business had recently passed a Council Safety Inspection, the firefighting training and plan together with aspects of the firefighting equipment at the factory were deficient.

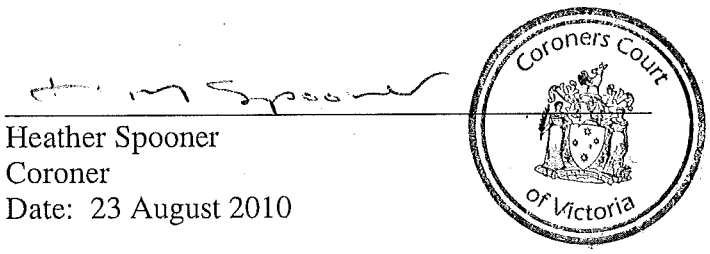
COMMENDATIONS:

30. I wish to commend all firefighters involved in fighting this fire and in particular Leading Firefighters O'Connell, Johnson and Fincher for their bravery in returning to the blazing fire to rescue Leading Firefighter Zapart.

RECOMMENDATIONS:

1. That Worksafe Victoria, the Metropolitan Fire and Emergency Services Board and the Country Fire Authority formally adopt and implement the Safety Management Plan (Attachment 'A') to establish a comprehensive multi-agency approach to preventing similar fires and protecting the safety of emergency services personnel, workers and the community.

Signature:



Heather Spooner
Coroner
Date: 23 August 2010

DISTRIBUTION:

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- Kevin Murphy, Chairman

Metropolitan Fire and Emergency Services Board
- Graham Fountain, Chief Executive Officer and Chief Officer
- Neil Comrie, President

WorkSafe Victoria
- Greg Tweedly, Chief Executive
- Elana Rubin, Chair

United Firefighters Union Victorian Branch
- Dave Hamilton, President

Furniture Industry Association Australia Vic/Tas
- John Osmelak, General Manager

Municipal Association of Victoria
- Rob Spence, Chief Executive Officer
- Cr Bill McArthur, President

Office of the Emergency Services Commissioner
- Bruce Esplin, Emergency Services Commissioner

Department of Justice
- Penny Armytage, Secretary

The Hon. Rob Hulls, MP
- Attorney General

The Hon. Bob Cameron, MP
- Minister for Police and Emergency Services and Minister for Corrections

The Hon. Tim Holding, MP
- Minister for Finance, WorkCover and the Transport Accident Commission

Safe Work Australia
- Tom Phillips, Chair

National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
- Dr Marion Healy, Director

Coroners Court of Victoria

Attachment "A"

Safety Management Plan for Nitrocellulose Products in Victoria

Developed in conjunction with:

WorkSafe Victoria (WorkSafe)

Metropolitan Fire and Emergency Services Board (MFB)

Country Fire Authority (CFA)

United Firefighters Union (UFU)

Furniture Industry Association Australia (FIAA)

Municipal Association of Victoria (MAV)

Office of the Emergency Services Commissioner (OESC)

1. Purpose

This safety management document has been prepared as directed by Coroner Heather Spooner in relation to the investigation of a fire at the business of Japanese Screens and Interiors (2007/4864).

The plan documents the strategies and arrangements agreed to by stakeholders to address the safety and use of nitrocellulose products in the small-scale furniture manufacturing industry.

These strategies and arrangements represent points of consensus between stakeholders following submissions to Coroner Heather Spooner and detailed discussions at Safety Management Meetings held in December 2009 and February 2010.

2. Actions and initiatives to date

Actions and initiatives which have already been progressed to date relate to the MFB and the provision of safe systems of work, including:

- Upgraded personal protective equipment (PPE) for all fire-fighters;
- Supplementation to training;
- Detection systems.

3. Actions and initiatives to be progressed

The existing Memorandum of Understanding (MOU) Steering Committee involving WorkSafe, MFB and CFA will actively address issues relating to the regulation of nitrocellulose-products and associated occupational health and safety issues. It is envisaged that this group will oversee a comprehensive multi-agency response to this emerging issue.

The MOU Steering Committee will progress the following issues:

A. **Intervention Project** – Nitrocellulose-product suppliers and end-users

   a. Compliance checking of suppliers of nitrocellulose-products to determine if they are meeting their obligations under the *Occupational Health & Safety Act 2004* (S.30) to provide purchasers/end users with appropriate information and resources regarding the safe use and storage of the products;

   b. Establish a register of nitrocellulose-product purchasers/end users from the 13 known suppliers and engage in a compliance checking and educative process with purchasers/end users to ensure the safe use and storage of the product;

   c. Circulate the details of nitrocellulose-product purchasers/end users to MFB and CFA to inform their operational planning and responses;

d. Review and update the nitrocellulose-product purchasers/end users register on a regular agreed upon frequency and provide to MFB and CFA;

B. **Ongoing audit and review of occupational health and safety issues** relating to nitrocellulose-products and the emergency services (including UFU), to ensure that safe systems of work are maintained, including the provision of adequate personal protective equipment (PPE), curriculum and training, and hazardous material detection systems;

C. **Longer-term strategic planning** regarding the further regulation of nitrocellulose-products, which may include the potential development of a "Code of Practice", a review of powers and functions relating to inspection and enforcement for fire agencies, the introduction of safer alternative products and/or the restriction or elimination of the nitrocellulose-products;

D. **Establishment of an information sharing process between the MOU Steering Committee and key stakeholders, including the UFU, OESC, MAV and the FIAA,** to ensure that they are kept up-to-date on the activities of the Committee, and have the opportunity to provide submissions and advice in relation to nitrocellulose products to the Committee.