

2018 Emergency Services Foundation Study Tour Report

Practical Fire Investigation

World's Best Practice

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Glossary of terms and abbreviations

CFA – Country Fire Authority
CO – Chief Officer
DCO – Deputy Chief Officer
EPA – Environmental Protection Authority
ESF – Emergency Services Foundation
ESO's – Emergency Service Organisations
FFMV – Forest Firefighting Management Victoria
FSC – Fire Service Commissioner
MFB – Metropolitan Fire Brigade
SES – State Emergency Service
SOP's – Standard Operating Procedures

Executive Summary

Structural Fires are common occurrences that have the potential to cause significant impact. Incidents involving structural fires have the potential for multiple losses of human life, infrastructure damage, community and economic impact. Incidents involving industrial fires with associated chemicals have the added potential for significant fire and permanent environmental impact.

For emergency service personnel, the risk is not wholly known or understood. This could lead to a very dangerous situation where hazards are not known and subsequently left untreated at an emergency scene. Emergency management personnel are exposed in this scenario where potentially life threatening situations exist.

With the new state of the art fire investigation training complex currently being constructed in Huntley Victoria I saw this as a chance to incorporate “world’s best practices” into this facility.

There are many identified “Health & Safety” implications for on scene fire investigators and to be able to take the learning’s from two of the world’s largest fire investigation training complexes cannot be underestimated. The gaps analysis I was able to conduct on both the health and safety aspect during the actual room burns and the SOP’s that these other services already follow will provide huge benefits to not only the CFA but all other fire services in Australia and potentially Australasia.

Recommendations

The recommendations of this report are that:

1. Safety Systems – The safety systems in place in both the USA and UK were of a very high standard and these need to be adopted as a matter of priority in not only our service but Australia wide.
2. Interoperability – Fire Services within Victoria currently have a good working relationship with other ESO's but to see how this is done internationally is a “step above” what we do here. They imbed ESO reps in each other's services to ensure cross communication and information sharing where applicable. This has a massive advantage when looking at things such as “pattern suspicious fires”.
3. Training College Design – Ensure that we learn from these international fire services of both the positive and negative in design and construction of any new facilities. These facilities are massively expensive to construct and must comply with all State and Federal legislative requirements and by looking at what has already been done both “good & bad” can save both money and time.
4. Fire Investigation Dogs – London FIU uses a dedicated team of dogs and handlers to identify the potential use of “Ignitable Liquids” at a scene. The time in which these dogs can sniff out trace elements of ignitable liquids was incredible compared to our current means of conducting similar testing via electronic means.

I would strongly recommend that we look at further investigation re introduction of these types of dogs in the future.

Emergency Services Foundation

The **Emergency Services Foundation** was established following the Ash Wednesday bushfires in 1983. It operates as a trust to provide immediate support for those who suffer hardship as a result of the death of a family member or injuries sustained in the line of duty.

The Foundation also provides educational scholarships to members of the industry and conducts support activities such as the annual Emergency Management Conference to increase the understanding of the key issues that challenge emergency services personnel.

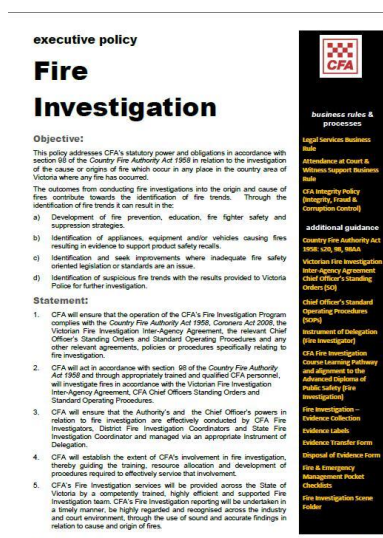
Background

CFA attends has the potential to attend approximately 1200 fire investigations per year ranging from structure, bush and vehicle. All of these incidents will where possible be investigated. Some of these investigations are done as a standalone service and some will be joint with other services such as Victoria Police Forensics,ESV or local CIU. As incidents of this type have various consequences, significant media coverage generally occurs and the potential for lengthy high level investigations and / or inquiries can ensue. Examples of such incidents are:

1. DTM industries in Dandenong which was assessed to be a 25 million dollar incident.
2. Beachworth Supermarket fire which was estimated at 12 million dollars in cost. Not accounting for loss to the community of major supermarket etc.
3. Every year there are numerous residential structural fires resulting in the loss of life which obviously has wide ranging impacts on multiple persons.

Currently CFA operate under a set of procedures and guidelines as do all other services which allows us to work collectively as a team whenever possible to conduct investigations to a high level.

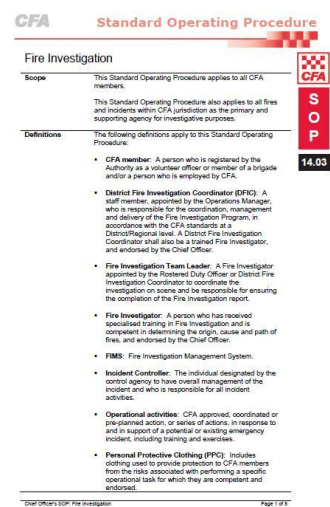
Examples of these are shown below.



Executive Policy



Inter-Agency Agreement



CFA-SOP's

Objectives

There were five main objectives of my study tour

- Investigate interoperability between ESO's and how this is achieved internationally.
- Investigate international training college design and as a result identify best practices in both room burns and firefighter safety.
- Investigate Safety Systems in place internationally to ensure we are achieving world's best practice.
- Investigate the benefit of "Ignitable Liquid Sniffing Canines" and the potential for introduction of such a unit into the fire investigation system here.
- Investigate other required SOP's to ensure we have the most effective and safest systems in place.

Key outcomes

The major tangible outcomes from the study tour were to:

- A document detailing world best practise and recommendations for emergency management arrangements around training and delivery of "Practical Room Burns", including:
 - Design and construction of the new facility
 - Firefighter safety whilst conducting examination of burnt rooms
 - Training methods and systems currently in place
 - Interoperability with other ESO's
 - SOP's
 - Engagement of and collaboration with relevant stakeholders

Study Tour: Organisations Visited & Overview

My proposal to the Emergency Services Foundation was to visit the following organisations that I had identified as being able to assist in achieving the objectives.

NETC, South Seton Ave,

Emmitsburg, Merryland, USA



As an entity of the US Department of Homeland Security's Federal Emergency management Agency, the mission of the U.S. Fire Administration is to provide national and International training and leadership to foster a solid foundation for fire and emergency services stakeholders in prevention, preparedness and response.

This college provides training for the U.S. and international students by means of both live in and off campus courses. It can accommodate approx 500 students on site at any given time and is one of the United States leading Fire Investigation training facilities.

It's Fire Investigation training section runs courses from a few days as an overview to a couple of months full courses and as such is able to provide for all ESO's and required levels.

The Fire Investigation training props are many and varied and are able to provide the student with students with extremely practical scenarios and allow for many differing room burns.



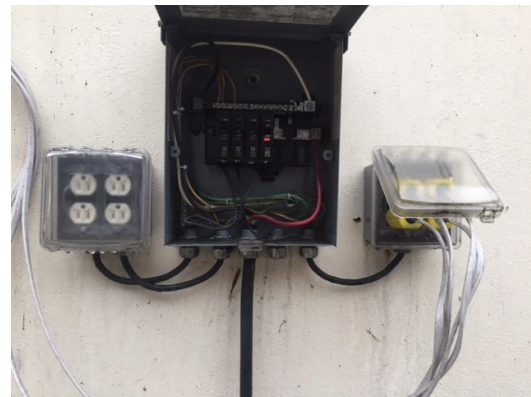
Room 1 & 2 of 8 burn rooms



Room 1



Electrical causation training prop



Switchboard for individual room



Internal burn rooms 3-4

This facility although older, allows for multiple students at any given time. The site is in line for a major rebuild in 2019 and as such I was able to discuss some of CFA's concept plans for their new facility and show how we were incorporating world class Thermal Oxidizing technology into our design to meet the needs of modern day environmental expectations. We were also able to discuss firefighter safety through atmospheric monitoring techniques.

The use of atmospheric monitoring to ensure firefighter safety is now a very recognized practice and with the identified long time exposure issues for potential cancers being attributed to continuous exposure over long periods whilst conducting fire investigations in the structural environment we need to ensure the knowledge of all services is shared in a bipartisan way.

The Fire Service College,

Moreton-in-Marsh,

Gloucestershire, England



The Fire Service College is a leading organisation for fire prevention and protection, providing assessed, accredited and assured fire and multi-service training for emergency service professionals globally.

With over 40 years' experience in delivering fire and rescue training internationally, we specialise in equipping today's firefighters and other emergency responders with the best possible skills and training to learn the latest techniques and procedures. Our unique incident ground, at one of the premier fire training venues in the world, coupled with our expert instructors, provides the opportunity for our learners to train and exercise in a realistic and challenging environment, for a learning experience that is second to none.

Course overview and learning outcomes

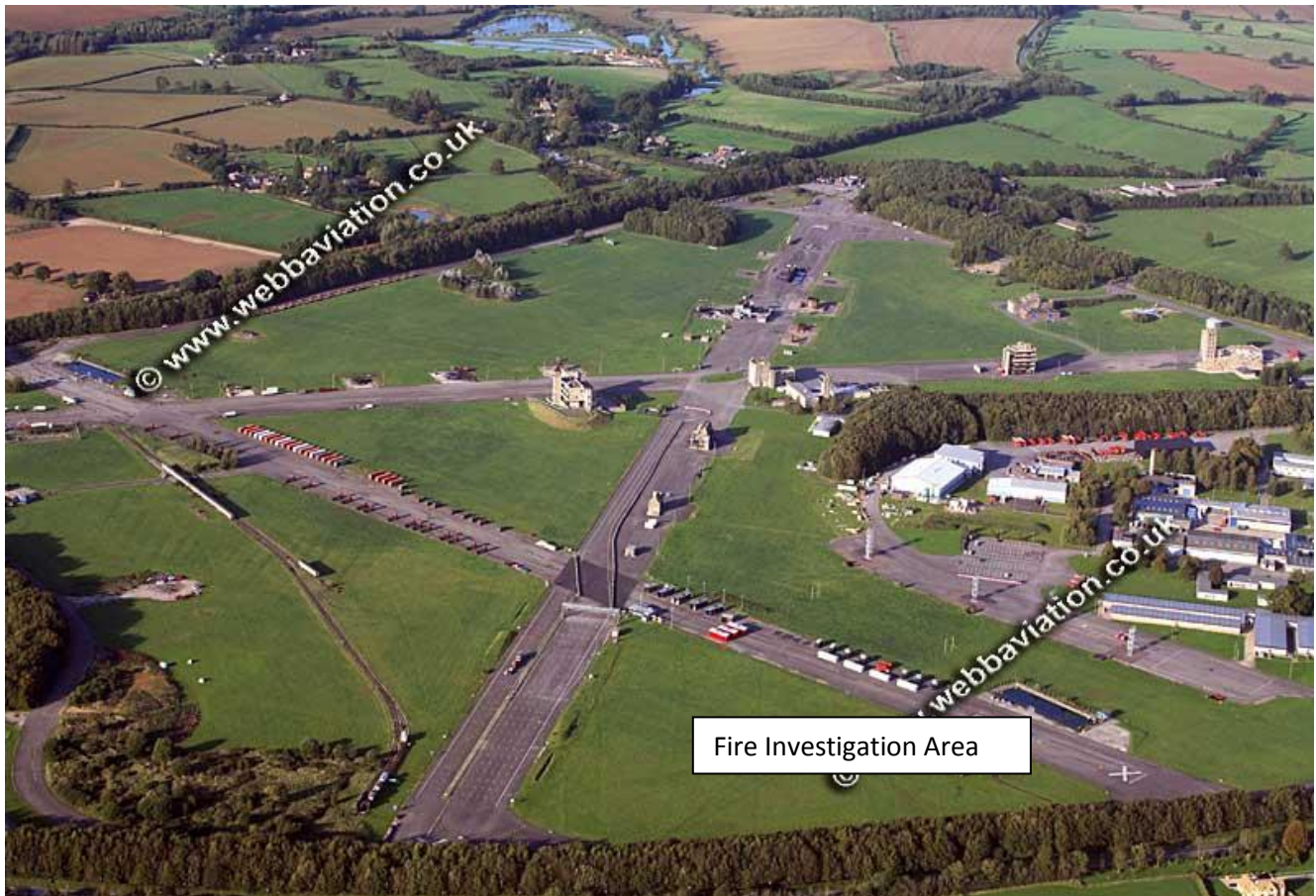
This programme has been developed and is delivered in conjunction with the College of Policing (COP) for both fire investigators and forensic investigators. This is a blended programme, consisting of internet based pre-course study (25 hours), followed by a one-week practical course.

The course provides students with the underpinning knowledge and understanding required for the role of a fire investigator and develops their investigative skills as a fire/crime scene investigator.

Learning Outcomes

On successful completion of the programme, delegates will be able to:

- Have an understanding of basic fire science, combustion, fire behaviour, toxicology of fire debris and electricity as a cause of fire
- Recognise the roles and responsibilities of the different agencies that may be involved in a fire investigation
- Work as an effective member of a multi-agency team in fire investigation incidents
- Maintain health and safety at a fire investigation
- Identify and analyse post-fire indicators that may be present at a fire scene in order to determine origin and cause of fire
- Identify the effects of an explosion at a fire scene
- Identify the signs of arson
- Use observational skills to identify items recovered from the debris, and to recreate the fire scene to identify points of origin
- Prepare and deliver a presentation on a fire investigation and the findings





Room burn extinguishment

The fire service college at Moreton-in-Marsh consisted of eight individual 40 ft containers that are fully lined powered and fitted out to replicate numerous rooms either in a domestic or industrial application.

They have gone down the path of installed “Thermo Couples” on some of the containers which are monitored via external control boxes attached to the containers. (see below)



This system although adequate is looking at being upgraded to be able to be monitored from a control room adjacent to the container burn area. This will also have the potential to record temperatures for comparisons at a later stage to ensure burn consistencies and safety.

London Fire Brigade Fire

Investigation Unit, City of

London, England



Considerable time was spent at the London Fire Investigation Unit (FIU) as it is recognized as one of the best units in England. It is structured as a 24 hour 10/14 unit. This means that the investigators work similar to operational station staff in as much as they do 10 hour days and 14 hour nights.

The service have found this to be the most effective means of ensuring rapid response to any requested attendance. They operate on a “on scene” appliance response as an automatic trigger for their attendance. The unit may also respond to any incident they believe warrants their attendance. They also provide specialist advice when requested and participate in design committees and Standards committees amongst other roles.



The unit provided significant resourcing for the Grenfell high rise tower fire in which 72 people passed away. This as we know has significant impacts for buildings with in Australia with already on significant fire in a Hi Rise building in Docklands.

It is envisaged that as a result of the current audits occurring throughout Victoria there will be hundreds of buildings which may be impacted. The results of this investigation will be shared internationally once the full Coronial enquiry has been completed in London.

I was also fortunate enough to have a look at the “canine unit” used extensively in London. Currently the unit consists of 2 dogs with 24hour handlers.

These dogs are housed at the unit during their handlers shift times and then taken home by the respective handlers.

To have an opportunity to watch these dogs work at a 2 storey unit fire initially deemed suspicious by first attending crews was amazing. The time it took for “Sherlock” to “sniff” the entire 2 stories was incredible. In approximately 10 minutes the whole unit was checked, if you compare how long this would have taken in the conventional way we do it with “TMX’s” or similar is no comparison.

The dogs are used only to check the scene and if they have “a hit” then the area is marked and electronic means are the used to confirm the presence of “ignitable liquids”

The dogs are found to have an approximate 96% success rate at detecting product.

The time they save on scene is immense along with their accuracy is something that more than justifies the initial training and ongoing cost to the London Fire Brigade.



Recommendations

Interoperability

1. **All Dept heads of the individual ESO's need to start to work more collectively in information sharing at not only management level but also at grass roots level.**
 - This was demonstrated to me at FEMA in Emmitsburg where the Fire Investigation Section has members from other ESO's imbedded in the section. This has resulted in cases where there has been serial offenders being identified quickly and as a result the arson related fires trends being dramatically reduced.

Best practices for room burns

2. **Continue to enhance and learn from International Emergency Services on how to best construct new facilities that will lead to higher quality training facilities.**
 - The CFA are well on the way to having if not the best one of the best Fire Investigation Training Facilities in Australasia.
 - Currently nothing else exists that will allow for the burns to not only be “Environmentally Friendly” but provide for a much safer working environment for the Fire Investigation students.
 - If we continue to foster the collective relationships with other International Services all services will benefit from this in the future.

Safety Systems

3. **We must continue to keep investigation “Worlds Best Practices” for all safety systems involving Fire Investigation.**
 - Through the concerted effort of many parties, State Fire Investigation Coordinator, CFA, UFU and Oh&S Reps we are making huge inroads into safety for our investigators. This has to continue to occur and this can happen by means of consultation and fostering relationships with all parties both Nationally and Internationally.
 -
 - There are new and improved safety systems continually being developed world wide and we should try to remain a leader in this field.

Fire Investigation Dogs

4. Evaluation of the worth of investing in the development of a dedicated “Fire Investigation Canine Unit”

- This is defiantly an area for further consideration by services in Victoria. Currently NSW Fire and Rescue run a Fire Investigation Canine Unit with excellent results.
- The results observed in both training and at an operational event showed to me that the value of this type of unit is justified. The time and resourcing it saved at a two story unit fire was dramatic.
- The challenge as I see it will not be convincing “troops on the ground” but the decision makers on the Boards of the services. Some people believe it is a “trendy” thing rather than a worthwhile investment. I strongly believe it would assist many of our ESO’s in time and resourcing which ultimately transmits to dollars spent, if the time on scene is reduced, the cost to the organization is also reduced.

Standard Operating Procedures (SOP’s)

5. Continuing to enhance the current Sop’s to reflect the continuous improvements being developed to by services to better reflect stronger work practices.

- CFA’s current SOP’s are some of the best I have seen in the field. There were some improvements to come out my trip to both the USA and UK. These have been passed on to the relevant people who can make the required changes.
- We need to ensure that we manage future SOP’s to reflect the continuous changes which can be expected to be developed to provide both safer working practices and better investigation management.

Conclusion

Now, more than ever, agencies are required to work together in the emergency management environment in order to deliver more favourable outcomes for the community. An opportunity exists in this area to make improvements that will achieve this goal whilst enhancing the safety of first responders.

It is well known that preparedness is the key to safe, effective and efficient operations. Preparedness in this context relates to collaboration between numerous agencies, identifying, analysing, documenting and accepting the risk within various geographical areas of responsibility, training our investigators how to be safe and how to deal with this type of emergency and exercising our skills, processes and procedures, together, in order to remain current and identify continuous improvement opportunities.

Fortunately, within Victoria, our various responder agencies are well resourced to deal with this type of emergency. Through the careful consideration and coordination of human and physical resources, any task can be completed. To guide this type of response, common doctrine is essential. Leading to common understanding, terminology, processes and procedures, there's less grey, less apprehension and a greater cohesive team response. The only possible outcome of this is increased safety for first responders and an improved service delivery to the community.

Having been lucky enough to be able to participate in this study tour and having the opportunity to visit services that are internationally recognized as leaders in the field of Fire Investigation. From what I experienced whilst on tour we are clearly on track to have a World Class Training Facility which will enable CFA to remain at the forefront of Fire Investigation both Nationally and Internationally.

I am comfortable in the belief that the current State Fire Investigation Coordinator has both the passion and drive to ensure the program not only continues at a high level but moves ahead to the next level.

What we need to ensure is that the CFA will look at what I believe are addressable gaps in our current and planned system to allow us to move forward in this important field.

I would sincerely like to acknowledge the help and effort afforded to me by both members of all Emergency Organisations I contacted regarding my proposal and also thank the members of the Emergency Services Foundation for allowing me to grow both personally and operationally through this scholarship.

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