

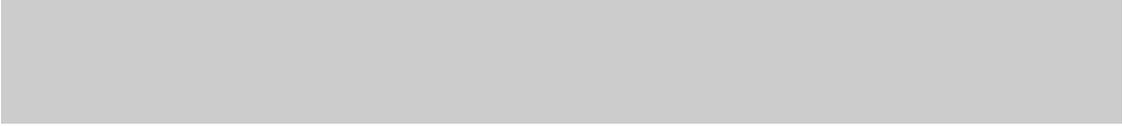
**1995
CHURCHILL FELLOWSHIP REPORT**

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“FIRE INVESTIGATION”

**CAN THE RESULTS
BENEFIT THE COMMUNITY ?**



**“Out of intense complexities intense
simplicities emerge.”**

Sir Winston Churchill.

(The World Crisis, 1923 - 1931.)

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EXECUTIVE SUMMARY

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Topic: **Fire Investigation - Can the Results Benefit the Community?**

The United Kingdom is currently undergoing major reforms within its Fire Services following an Audit Commission report titled;

“In the Line of Fire, Value for Money in the Fire Service”

In the UK, Fire Authority’s currently have a power, but not a duty, to investigate fires and provide community education to the public. For this reason, brigades with dedicated fire investigation units are under pressure to provide a service other than investigating the cause and origin of fires. The service that most brigades are aiming towards is utilising fire statistics from investigations to target community education programs.

Changes are being forced upon the UK Fire Services, and Australia stands to learn from these reforms. One of the primary recommendations of this report is strong support for a shift in Fire Service emphasis from one of cure to one of prevention. Should we follow the UK lead which recommends that; *“fire authorities should be given statutory responsibility to promote fire safety - to educate the public about fire, its causes, its dangers and ways to combat it”*.¹

Given the legislative responsibility that most Fire Services in Australia have to investigate fires, it is possible that this report will provide a framework for the ACT Fire Brigade, and hopefully other Fire Services in Australia, to utilise fire investigation results to benefit the community and provide them with value for money.

¹The Audit Commission. 1995 *In the Line of Fire, Value for Money in the Fire Service. The National Picture*. HMSO London. p. 6.

It is inevitable that the Fire Services in Australia will go through a shift in emphasis due to the continuing tightening of Government spending. Reduced funding will result in firefighting being a last line of resort in combating the dangers of fire, yet fires do and will continue to occur.

Fire services need to gather information from these fires, and to use that information as a basis for community education programs. Each fire attended and extinguished is only part of the battle. Fire Services should be attempting to stop fires from occurring in the first place.

Given that Australia already has arguably the most comprehensive national incident reporting systems and data base in the world, Fire Services should be looking to disseminate this information locally to target fire safety education where it is required, within the community each Fire Service protects.



INTRODUCTION

During March and April 1995, with the assistance of The Winston Churchill Memorial Trust of Australia, I was given the opportunity to work with seven different Fire Brigades in England, Scotland and Hong Kong.

I undertook a variety of tasks during my secondment with those brigades. Activities undertaken ranged from operational firefighting on front line appliances, responding with dedicated Fire Investigation Teams, and responding with Senior Officers as part of each brigade's command structure.

To assist my studies, I completed the UK's National Fire Investigation course, worked with brigades fire investigators, analysed local and national statistics, and saw how each brigade utilised trends and patterns to target community education.

It is my intention with this report to recommend the following:

- ◆ A training structure for ACT Fire Brigade officers and fire investigators.
- ◆ A liaison and response structure that suits all agencies involved in investigating fires.
- ◆ A system that utilises information from the Australian Incident Reporting System (AIRS) database to target community education needs.

The opinions offered in this report are those of the author, based upon experience gained whilst working in Australia and whilst Overseas on the Churchill Fellowship, and are not intended to reflect current or future policy decisions of the ACT Fire Brigade or ACT Emergency Services Bureau.

I would like to thank the following organisations, and by doing that, the staff of those organisations who are too numerous to mention, for their help before, during and after my visits. Many thanks to you all.

Organisations who provided assistance.

The Fire Service College, Moreton in Marsh.

The West Midlands Fire Service.

Nottinghamshire Fire and Rescue Service.

West Midlands Coroners Office.

Forensic Science Services, Birmingham.

Institution of Fire Engineers.

West Midlands Police.

Strathclyde Fire Brigade.

Lothian and Borders Fire Brigade.

Lothian and Borders Police.

Tyne and Wear Metropolitan Fire Brigade.

Northumbria Police.

Cleveland County Fire Brigade.

London Fire and Civil Defence Authority.

London Fire Brigade.

Heathrow Airport Fire Service.

Hong Kong Fire Service.

Australian Capital Territory Fire Brigade.

Australian Fire Authorities Council.

Most importantly, I would like to thank my wife Kirsty and daughter Meaghan for their support whilst I was away, and their tolerance when I returned and buried myself in front of the computer.

Background Information.

Throughout my study tour, I attempted to look at fire investigation in a holistic manner, with a view to determining a “best practice” for utilising the results of fire investigations in a manner which is proactive and ultimately benefits the community.

The UK Fire Services were chosen for the study as they provided a framework that is very similar to Australia’s with regards to legal systems, legislation and history. The Hong Kong Fire Service was chosen for two reasons, firstly the service was developed upon the British system, and secondly it reportedly has a very low incidence of fires reported as being of unknown origin.

Fire Investigation is a necessary part of a fire brigades work, yet the current economic climate demands more justification to fund fire investigators, rather than just a need to determine the cause and origin of fires. The ability to tie fire investigations into community education and ensure that one follows on from the other should provide an incentive for the provision of fire investigators.

By highlighting the costs to the community of fires through deaths, injury’s, property loss and all of the associated socio - economic factors involved, it is hoped to show that the benefits provided by fire investigators and subsequent community education initiatives, outweigh the costs involved in providing the service.

Whilst the investigation of criminal matters is a Police function, it needs to be pointed out that in Australia for the year 1990 - 91, incendiary or suspicious fires accounted for a reported 45% of all fires.ⁱⁱ With fire fighters and officers the first in attendance, they have the responsibility to determine the cause and origin of the fire. Without sufficient training and liaison, there is a possibility that crimes are not being recognised, with the socio - economic

ⁱⁱ CSIRO 1993. *Australian National Fire Incident Statistics 1990 - 1991, 1991 - 1992*. p. 33.

consequences being passed on to the community as a whole through higher insurance premiums, government rates, etc.

Throughout the report, emphasis has been placed on cost neutral initiatives for the provision of fire investigators for the ACT Fire Brigade.

United Kingdom.

The Fire Service in the UK employs over 54,000 staff which consists of Wholetime firefighters, Retained firefighters, Control room staff and support staff.

The Fire Service is organised into 54 brigades which consists of 47 County brigades, and 7 Metropolitan brigades.

The total expenditure for the Fire Services is in excess of £ 1,250m a year (\$A 2,717.4m). This represents 2% of local authority expenditure or about £ 24 (\$A52.00) per head of population. This funding is met almost wholly through local and national taxes.

The services are responsible for four major activities, these include:

- ◆ firefighting.
- ◆ fire safety inspections and enforcement.
- ◆ fire prevention.
- ◆ responding to special service incidents.

The fire brigades are run by local fire authorities, who are required to operate within a prescriptive and detailed national framework. The framework is determined by the Central Fire Brigades Advisory Council (CFBAC), who represent the fire services, and advise the Home Secretary. The national framework is administered by having fire authorities seek and secure the Home Secretary's approval for any reductions in staffing and fire cover, and any reductions that lessen the brigades ability to comply with national standards will not be approved.ⁱⁱⁱ

ⁱⁱⁱ i op.cit. The Audit Commission. pp. 5,6

Funding for fire authorities is based on a formula which takes into account key data including resident population, population density, the amount of 'A' risk territory (see Glossary), and the amount and number of fires and false alarms attended. This data provides the central government with a standard spending assessment for each brigade.

The composition of the standard spending assessment is broken down into the following values:

Resident population	£9.78 per capita. (\$A 21.26)
Population density	Value dependent upon weighted density factor.
Fire and false alarm calls	£476.58 per fire or false alarm call. (\$A 1036)
'A' risk area	£619.58 per hectare of 'A' risk. (\$A1346.91).

The Department of the Environment and the Home Office are currently investigating a revised approach to funding.^{iv}

Hong Kong

The Hong Kong Fire Brigade was established in 1868, and initially came under the direction of the Head of Police in Victoria. In 1960, the Hong Kong Fire Service Department was established, and the brigades were reorganised. Smaller stations were opened with the main criterion being a six minute response time to anywhere in Hong Kong and the Territories.

Officers were predominantly ex patriots, until the retirement of the last ex pat: in 1992.

The Hong Kong Fire Service is responsible for firefighting, rescue and ambulance services for the areas of Hong Kong Island, Kowloon, New Territories and Hong Kong International Airport. These services are achieved with 65 fire stations, 4 fire boat stations and 29 ambulance depots located strategically throughout the territory, and staffed with 7293 uniformed personnel.^v

^{iv} i op.cit. The Audit Commission. pp. 39,42.

The territories are divided into 3 operational commands which are, Hong Kong, Kowloon and New Territories. Each command is headed by a Chief Fire Officer, who is assisted by a Deputy Chief Fire Officer. Each command is divided into 5 divisions, 4 of which are operational divisions and one is a Fire Protection Bureau regional office. The Fire Service has a total budget of HK \$1,424.88 Million per annum (\$A260 Million). HK \$1,290.84 Million (90.5%) of this budget is spent on salaries and allowances. Funding is totally Government provided, and accounts for 1.39% of the total budget of the Hong Kong Government.^{vi}

^v 125th Anniversary of the Hong Kong Fire Services. 1868 - 1993.

^{vi} Government Information Services 1993. Hong Kong Fire Services Review 1991 & 1992.

THE CURRENT SITUATION

The United Kingdom (UK) experience.

During the year 1993 in the UK, fires resulted in losses of £2,425M^{vii} (\$A 5271.7M). In 1988, fire losses accounted for 0.21% of the UK's gross national product (GNP).^{viii} Property damage in the UK by fire resulted in losses of at least £ 648 M (\$A 1408 M) in 1993. Of these fires, 50% were thought to have been the result of Arson. Around 30% of fire insurance claims are thought to be fraudulent, with the fires being started by, or on behalf of the insured.^{ix} It is believed that more than 50% of all large fires (above £25,000) and 30% of all other fires were possibly attributable to vandalism.^x

As a direct result of these types of losses, and the number of fires reported as being of *undetermined origin*, the Home Office has issued a number of directives in the form of Fire Service Circulars. These directives were aimed at achieving a national approach and cohesiveness to Fire Investigation. The circulars are as follows:

1983 Home Office, Fire Service Circular 8/1983

Fire caused by vandalism.

1985 Home Office Circular 71/1985

Fire Service Circular 9/1985

The investigation of fires of doubtful origin.

^{vii} i op. cit. The Audit Commission. p.10.

^{viii} Jones B. Fire Australia 1993, Conference Proceedings *The History and Future Directions of Fire Statistics in Australia, Appendix A Table 1.*

^{ix} Strathclyde Police and Insurance Liaison Group. April 1995. "Sharing responsibility to stop fraud" p.8.

^x Home Office Working Party. *Fires caused by Vandalism.* HMSO. p.11.

1992 Home Office Circular 106/1992

Fire Service Circular 10/1992

The investigation of fires of doubtful origin.

In 1983, the Home Office called for a review of arrangements for liaison between the fire service and police when dealing with the problem of fires caused by vandalism. Emphasis was placed on the formation of working groups of Senior Officers to meet and formulate strategies to form closer working relationships between agencies. Prior to the release of these circulars, a number of counties and major cities had taken initiatives to reduce the number of unknown fires, London being one notable example, which had formed a dedicated Fire Investigation Unit.

In 1985, Fire Service Circular No 9/1985 was issued, which reiterated the need for a multi agency response to Fire Investigations. The number of fires attended by Brigades that were thought to have been of doubtful origin was a continuing issue and concern for the Home Office. Special mention was made of the number of fires reported as being “*where malicious or deliberate ignition is suspected but not established.*” This figure was 6,500 out of 15,500 doubtful origin fires^{xi} (41.9%).

There was also mention made of the number of fires being classified as unknown or unspecified cause (4500 in 1983).^{xii}

The 1985 circular called for no changes to be made to the procedures suggested in 1983, but called for a clearer definition of the roles and responsibilities of each agency to be spelled out. A procedural summary of the recommended appropriate action by the respective services was added as an annex to the circular. Whilst not binding, this annex gave agency’s clear guidelines as to the way fire investigations should be conducted.

^{xi}Fire Service Circular No 9/1985 *The investigation of fires of doubtful origin.* HMSO.

^{xii}Fire Service Circular No 9/1985 *The investigation of fires of doubtful origin.* HMSO.

Section 4 of the circular stated:

*“It is clear that the investigation of fires of doubtful origin entails a multi disciplinary approach and that, in the sequence of events from the first suspicions that the origin of the fire have been other than accidental to subsequent investigation and successful criminal prosecution, the closest liaison, cooperation and mutual assistance between police, fire, and forensic science services is called for. This requires not only an appreciation of the legal responsibilities of the respective services but also of the special qualities and different skills, experience and support facilities which are available to them. **Roles and responsibilities must be clearly identified.**”^{xiii}*

Fire Service circular 10/1992 suggested no radical departures from the procedures suggested in 1983 and 1985. It included information on the number of fire investigation units in the UK, which at that time stood at 2 wholly dedicated units, and a further 12 designated Fire Investigation units who undertake other duties until required.

In 1992, figures were provided regarding the number of fires occurring in dwellings, and although the number of fires in dwellings had risen by 72% from 1983, the occurrence of fires being undetermined was not considered to be of such concern as in previous years.

The results of these directives can be seen in the number of fires that are reported of unknown origin.

In London, the amount of fires in occupied buildings where the source of ignition was determined as being unknown has dropped from 692 (5.3%) to 91 (0.7%) from 1984 to 1993.

In the West Midlands, there has been a 14% decrease in the number of fires of unknown origin between 1984 and 1994, See Table 1 Appendix B for year by year trends.

In Strathclyde in 1994, the brigade attended over 10,000 fires in heritage buildings and property. Of this figure, some 4000 were attributed to wilful fire raising^{xiv} and less than

^{xiii} Fire Service Circular No 9/1985 *The investigation of fires of doubtful origin*. HMSO.

^{xiv} Wilful fire raising equates to Arson.

1.5% were recorded as having an unknown cause. The brigade claims that these figures are attributable to a systematic investigation of the events by fire investigators.

In Cleveland County, of the total number of fires attended, only 0.5% were reported as being of unknown origin. Only 10 (1.1%) of the fires reported in domestic households were attributed to unknown origin. Of the total number of fires attended, only 0.5% were reported as being of unknown origin.

In Hong Kong for the year 1994, only 4.7% of fires were reported as being of unknown cause.

By comparison, in the ACT, 26% of the fires attended by the ACT Fire Brigade are reported as unknown origin. Nationally the figure is 9.3% ^{xv}.

Following the release of the Fire Service Circulars a number of different types of Fire Investigation approaches have been put in place by UK Brigades. The benefits that are gained by closer cooperation and working relationships between Fire Brigades and Police has resulted in a more detailed examination of fire scenes being gained through joint investigations.

The Home Office strongly recommended that all UK Brigades form Fire Investigation units, either in conjunction with the Police, or alone for the following reasons:

“The advantages of such teams are, in the Home Secretary’s view, self evident; not only can they do much to promote cooperation and coordination at all levels between the police and fire services, but they also offer a means of more accurately identifying the causes of fires and, in the case of those fires thought to have been started deliberately, thereby assisting the police to bring the culprits to justice.” ^{xvi}

The Home Office also emphasised the value of Police and Fire Brigade cooperation in the investigation of arson, as a large number of fires of unknown origin could be attributed to a cause if a sufficiently detailed investigation were undertaken.

^{xv} ii -op. cit CSIRO. Table 37.

^{xvi} Fire Service Circular No 8/1983 *Fires Caused by Vandalism*. HMSO.

The Australian Capital Territory (ACT).

In the ACT in 1993, of the 1389 fires or explosions attended by the ACT Fire Brigade^{xvii}, 249 were classed as arson or offences against property. This figure equates to 18% of all property fires attended by the brigade and resulted in a monetary loss to the ACT community of \$A 3,559,226^{xviii} due to arson alone.

From 1st January 1994 until 31st December 1994, the ACT Fire Brigade attended 1552 fires. A summary of the causes for these fires by each Australian Incident Reporting System (AIRS) classification shows:

Division 1 Incendiary

Legal decision or physical evidence indicates that the fire was deliberately set.^{xix}

Code 10 Incendiary, further information undermined or not reported.

3 fires

Code 11 Incendiary, not during civil disturbance.

48 fires

Division 2 Suspicious

Circumstances indicate the possibility that the fire may have been deliberately set, multiple ignitions were found, or there were suspicious circumstances and no natural ignition factor could be found.^{xx}

Code 21 Suspicious, (suspected deliberate ignition) not during civil disturbance.

486 fires

Code 22 Suspicious, (suspected deliberate ignition) during civil disturbance.

29 fires

Code 20 Suspicious, (suspected deliberate ignition), further information undetermined or not reported.

49 fires.

^{xvii} ACT Government. 1994. *Department of Urban Services Annual Report 1994*. AGPS. p. 64.

^{xviii} Australian Federal Police. 1993 *Annual Report 1993 - 94*. p. 78.

^{xix} Australian Assembly of Fire Authorities. *Incident Reporting System Reference and Instruction Manual*. Block E p. 15.

^{xx} Ibid. Block E p. 15.

Of note is the number of fires for the period that had an *ignition factor undetermined or not reported*:

Code 00 408 fires.

This figure accounts for 26% of the fires attended by the ACT Fire Brigade.^{xxi}

For the same time period, fires resulted in the following direct losses to property.

Monetary loss at fires in the ACT in 1994.

The total estimated monetary value of the fire damage caused by fire and firefighting operations in 1994.

\$A 147,998,000.

The total estimation of the value of the property involved in fires, including contents in 1994.

\$ A 750,297,000.

The total estimation of the value of the pre fire contents.^{xxii}

\$A 175,038,000.

These figures are all fireground estimates made by the Officer in Charge of the incidents attended by the ACTFB. All data was accessed from the ACTFB AIRS database.

^{xxi} ACT Fire Brigade AIRS data base.

^{xxii} iv op.cit. Australian Assembly of Fire Authorities. Block H. pp. 1 - 2.

The cost of injuries.

It is estimated that the cost to the UK economy for death and injury due to fires is in excess of £ 750m (\$A 1630m) per year.

In Australia, the costs to the government and community associated with fire related deaths and injuries are enormous, both emotionally and financially. For injuries alone, *"Burns patients may require multiple operations with attendant blood loss, scarring, loss of function not to mention psychological problems. The financial cost to the community is considerable and includes their treatment, the results of any litigation and the fact that many never return to gainful employment"*.^{xxiii}

"The minimum cost of providing such health care services is \$1100 per day. The burns unit at Concord indicate that at least one third of such injuries which occur in NSW require the person to be admitted to hospital for an average of 12.8 days".^{xxiv}

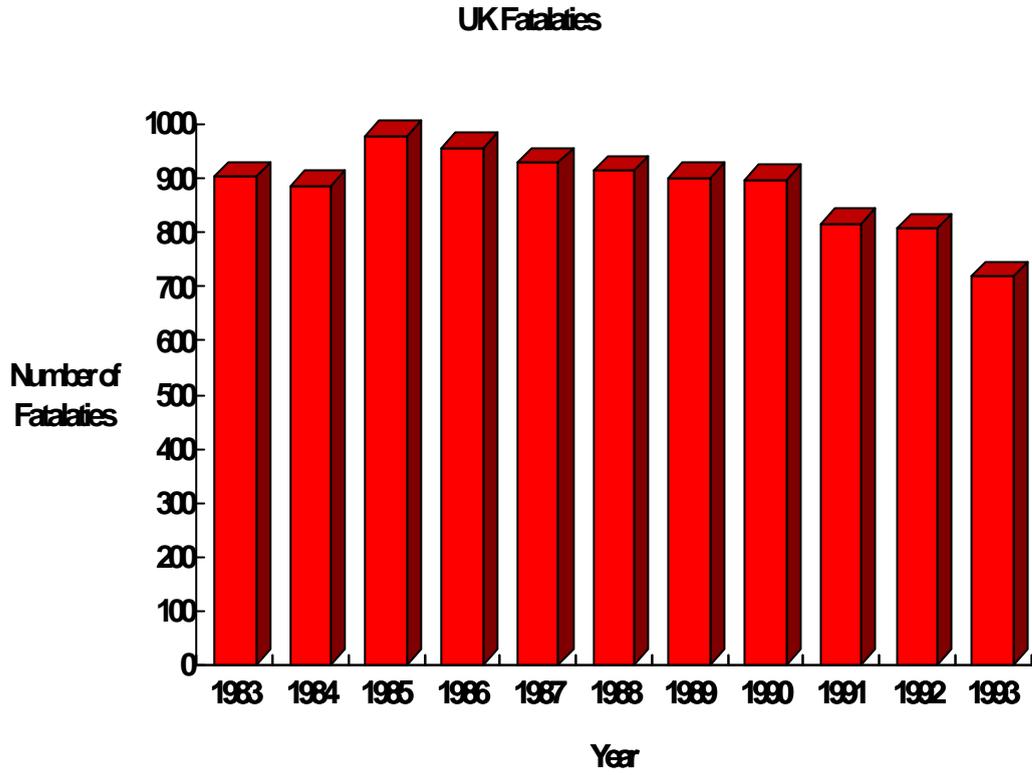
Australia's death rate in fires has risen from 6.07 per million of population in 1989/90 to 8 per million in 1990/91^{xxv}. Whilst these figures are not good, they compare favourably with the UK where the death rate in fires is 12 per million, one of the highest European rates. The UK however has managed to show a decrease in fire deaths since 1990, which corresponds with the introduction of a national smoke alarm installation campaign.^{xxvi}

^{xxiii} Kennedy, P.J. 1993 "Current Management of Burns Injuries" - Paper presented at Fire Australia Conference 1993 - p. 1

^{xxiv} Williams, P. 1993 - "Economic Evaluation Study of Smoke Detectors in Class 1a Buildings" - August 1993 - p. 7.

^{xxv} ii -op. cit CSIRO. p 29.

^{xxvi} Home Office Statistical Bulletin. 1994. *Summary Fire Statistics. United Kingdom 1993*. HMSO. Table 12.



Home Office Statistical Bulletin, United Kingdom

Table 6 Summary Fire Statistics.^{xxvii}

^{xxvii} xxv - op. cit. Home Office Table 6.

Training

In the UK

As an indirect result of the Fire Service Circulars mentioned earlier, the Fire Service College introduced the Fire Investigation Course at Moreton in Marsh as a joint training course (See Appendix A). This course was intended to provide a national focus for fire investigation, but it would appear that brigades are moving away from the Fire Service College due to financial constraints, and each brigade is developing its own fire investigation training. Details of the courses being run by each brigade can be found in the Appendices.

In the ACT

As detailed on page 34, training has been put into place by the ACT Fire Brigade which offered a short term solution. The ACTFB now needs to consider its long term training goals and objectives.

The last five years has seen the formalisation of Competency Based Training (CBT) in Australia, and in particular the introduction of the Australian Fire Agencies Competencies (AFAC's) for Fire Services, and the Australian Committee for Training Curriculum (ACTRAC) suite of Fire Technology Certificates and Diplomas.

These competencies will compliment the system of fire investigation suggested in this report. Officers attending incidents as Officer in Charge (OiC) should as a minimum have completed the following AFAC's modules;

- 4.05A** Fire Investigation, Wildfire Origin and Cause Determination.
- 4.05B** Fire Investigation, Structural and Vehicle Fire Cause Determination.
- 4.06** Fire Investigation, Legal Procedures.

These modules should be regarded as “Core Competencies” for Station Officers in the ACTFB.

In addition to undertaking these modules, the opportunity exists for a long term plan to further relations and liaison between the ACTFB and AFP. Selected members of the AFP Forensic Science Division could be trained as Workplace Assessors of CBT, a training module that the ACTFB can deliver and is nationally accredited.

The role of the members of the AFP as Workplace Assessors will cover a number of activities which are designed to assess the competency of a person undertaking training.

AFP members could be used as “job experts” in conjunction with trainers from the ACTFB, and would be able to provide recommendations as to whether a candidate is competent, provide feedback to training candidates and trainers, and identify options for further training if required.

Understandably this will cause problems, not the least of which would be the large number (in excess of 70) of Station Officers requiring assessment. Even if the process of assessment does not come to fruition, members of the AFP who have undertaken Assessor training with the ACTFB would have a greater awareness of what Station Officers were trying to achieve when they are undertaking any workplace based projects or assessments related to fire investigation.

This understanding can only benefit the liaison process, and is a step in the right direction with regards to joint training and understanding.

Training of District Officers responsible for Fire Investigation duties will be more complex. In addition to showing competence in the AFC modules, it would be desirable if the Officers were to undertake the ACTRAC Diploma of Fire Technology, to gain higher qualifications that are nationally recognised.

Studies should concentrate on the 18 compulsory modules, then elective block C, Fire Investigation. The modules included in this elective block include;

ABD739	Principles of Fire and Explosion Investigation.
ABD740	Fire and Explosion Investigation 1
ABD741	Fire and Explosion Investigation 2 ^{xxviii}
4.06	Fire Investigation, Legal Procedures.

Given that the AFP has had considerable input into the ACTRAC project, it is highly likely that members of the Forensic Service Division will be undertaking the same modules.

Whilst not pre-empting what training the AFP will undertake, it would be highly desirable and advantageous if members from both services were studying towards the same qualification. This training would also be available for the employees of Insurance bodies, Public Utilities etc who are required to have an input into fire investigations.

At least 4 years will elapse before any service has a graduate from this program as the minimum nominal time-frame, not taking into account recognition and exemption from modules, is 1325 hours of study.

The need to have highly qualified fire investigators cannot be understated. This approach to training, if adopted by the ACTFB, would go well beyond the training advocated in the UK, and would be the equal of any in the world. Any training that has been undertaken by Officers previously should hold them in good stead whilst undertaking further studies. The formalisation of qualifications to Nationally accepted standards will also benefit Officers of the ACTFB who may be called upon to provide expert testimony in court.

^{xxviii} ACTRAC National Fire Technology March 1995. *Accreditation Application Curriculum Framework for Fire Technology.*

Liaison

Liaison between services involved in fire investigations is a major issue in the UK and numerous reports have highlighted the need for liaison to be improved.

(Report of Fire Safety Legislation and Enforcement, Fire Investigation Working Group, Arson Report of the Association of County Councils, Working Party April 1987, Report of Home Office Working Party on Fires Caused by Vandalism, Home Office Circulars No's 71/1985, 9/1985, 106/1992, 10/1992).

The Strathclyde Fire Brigade has gone one step further and formalised a Major Fire Response Group. The objective of the group is to discuss the possible joint improvement of criminal investigations into major wilful or fraudulent fires.

The group was formed following the consensus of opinion from all involved that investigations appeared disjointed, lacked a cohesive approach, required streamlining and as a consequence evidence was being lost not only at the scene but during the investigation as a whole. To date the group is yet to be called operationally. More information on the group can be found in Appendix D.

The West Midlands have a close, informal liaison with the Birmingham Coroner and the West Midlands Police Scenes of Crime Senior Officers. The liaison between these services and the Fire Brigade is exemplary and has even been extended to include the burns unit at Birmingham Hospital which is a regular contact point for West Midlands Fire Investigators.

London Fire Brigade has a more formal approach to liaison, which is none the less just as effective. A series of forms are submitted to the London Metropolitan Police which include details of the incident, fire brigade observations, firefighting actions and security of the building. The London Fire Brigade also reports to the Police, fires which they believe to be suspicious, yet which the Metropolitan Police Fire Investigation Unit did not attend.

The experience in the UK has shown that it is possible for brigades with both full time and recall fire investigators to maintain effective liaison between services.

In Hong Kong, liaison between the Fire Service and major insurance agencies has resulted in the number of malicious fires in Hong Kong decreasing. It is claimed that an increase in inspections by the Fire Protection Bureau and Fire Service, the movement of manufacturing plants to mainland China due to cheaper labour, and a change in the way insurance companies pay out after fires, have all contributed to the reduction. Insurance companies now only reimburse for damaged goods and property, not for loss of potential or real earnings. This has resulted in the fact that the malicious ignition of premises or stock is less profitable, and its occurrence has decreased.

Although assured by Senior Officers of the Hong Kong Fire Service, statistical evidence to support these claims could not be found.^{xxix}

In Australia for the year 1990 - 91, incendiary or suspicious fires accounted for a reported 45% of all fires.^{xxx} A system of liaison and joint investigations is essential so that there is no possibility that crimes are not being recognised.

^{xxix} Conversation between Senior Divisional Officer Lee, Divisional Officer David Choy, Hong Kong Fire Service and author, 24th April 1995.

^{xxx} *ii op. cit.* p. 33.

Command Structures

In the UK a Command Structure is identified for each brigade, which incorporates staff from operational and day work positions. To support the Operational Senior Officer, other Officers are assigned functional control responsibilities on a roster, and are responded as part of a pre determined attendance (PDA) to incidents.

The definition of roles and responsibilities in the ACTFB needs to go well beyond just that of fire investigators. Presently the Operational District Officer bears the responsibility of a large number of duties at any given incident. Whilst these responsibilities are handled on a day to day basis, the determination of the cause and origin of the fire, when it is not readily identifiable, should not be one of his tasks.

Currently the ACTFB has Senior Officers in other than operational positions, that could be responded as part of a PDA plan, to investigate fires and conduct other support functions as required.

If training for Station Officers were adopted, there would come a time when the dependence on specialist investigators could decline, but a system of back up will always be required.

The use of District Officers on a type of flexible duty roster, (see Appendix I for award structure in UK) could be one solution. Officers could be rostered with functional duties at incidents, but can continue with normal duties until responded.

Given the industrial implications involved with a change in rostering systems, the UK model may not be ideal for the ACT, but its applications warrant consideration.

One functional area that should become a dual role is that of Fire Investigator and media liaison. The two functions compliment each other, and can alleviate the problem of misleading or incomplete information being released to the media regarding the cause and

origin of fires. Close liaison with the Coroner and Police is required before any details are released, and if adopted the position of Fire Investigation Coordinator would have both of these contacts, and would be in a position to release pertinent facts surrounding the fire.

The NSW Fire Brigades adopts this principle and the system works to good effect.

“It has been said that the dominant lesson of history is that mankind is unteachable.” Sir Winston Churchill 8th March 1946.

Educating the Community.

In the UK

In the UK, chip pan fires are a major problem. This has led a number of brigades to invest in a mock up of a kitchen, mounted on a trailer, on which a chip pan can be left on and unattended until ignition occurs. The simulation then involves throwing a cup of water on the burning oil, and allowing the crowd to see the devastating results of the incorrect application of an extinguishing median, under controlled situations.



Chip Pan Fire in use by Cleveland County Fire Brigade.

The fire is then reignited, and the correct way of extinguishing the fire is demonstrated. This simple but effective fire safety message has come about as a result of interpreting fire statistics and trends, and is just one of the many fire safety messages being used around the UK.

Fire safety needs to be aimed at school aged children if the number of child fatalities in fires is to be reduced. In the UK, a number of schemes are in place that target children in schools.

In London, a package entitled “Learn not to burn” has been introduced into the schools system as part of the National Curriculum. This three volume set targets children between the ages of 5 and 14 in three phases. Those phases are 5 to 8 year olds, 9 to 11 year olds and 11 to 14 year old children.

Each year, the London Fire Brigade gives fire safety talks to over 70,000 pupils between the ages of 9 and 11 as part of the Authority’s Schools Lecture programme.

In Edinburgh, the Lothian and Borders Fire Brigade has a Community Education Department that uses a four level education package in schools (See appendix E). The objective of the packages is to ensure that children have the potential to dramatically influence the community’s fire related problems.

The aim is to have pupils leaving school and entering the community as young adults who have received fire education at 4 levels throughout their academic life.

It is hoped the program will create a new fire conscious generation who possess the potential to dramatically improve the appalling record of fires, fire deaths and injuries. The department is also in the process of producing an interactive teaching package based on CD - ROM.

Strathclyde Fire Brigade is one of a number of fire brigades using a system called the “crucial crew” where school children are introduced to various situations and allowed to

deal with them as they see fit. This could consist of a hazardous kitchen scenario or escaping through a smoke filled hallway then calling the fire brigade.

These scenarios are conducted using police, fire brigade and ambulance personnel, who subsequently debrief the children after the scenario.

Community based firefighters is another initiative that is being used in the UK, and nowhere more than Tyne and Wear. Firefighters are assigned an area of the community to promote fire safety, the areas being decided upon after analysing fire trends. Tyne and Wear are also investigating the possibility of a fire safety campaign aimed at aged carers, giving advice on what fire risks to look for in elderly peoples homes, so that the problem of elderly fatalities may be addressed.

The West Midlands Fire Brigade has enjoyed success in the last few years from its publicity campaigns which were prompted by the levels of fatalities in the county.

The campaign focussed upon:

- ◆ High risk groups.
- ◆ Common causes of fire
- ◆ Links with local press and businesses.
- ◆ Monitoring and evaluation.

This concentrated effort has led to a 70% reduction in deaths and casualties over the last four years.^{xxxii} This reduction though has come at a cost elsewhere within budgets, in order to fund the high profile safety promotions.

In a perverse twist, it has been suggested that the Fire Investigation Unit be disbanded to continue funding for fire safety. In an attempt to stave off this closure, the unit's focus has been altered from one of Fire Investigation to one of Fire Research and Investigation.

^{xxxii} Institution of Fire Engineers 1995. *Fire Engineers Journal*, June 1995. p. 17.

Although this is not a comprehensive look at community education programs, it can be seen that in the UK, the emphasis is on using statistics gathered from fire investigations, to target community education.

In Australia

“Most Fires occur in one & two bedroom family dwellings, in the kitchen, where fat or grease (food) ignited on a stationary cooking surface after being left unattended. The peak period for such fires was just after 5PM and lasted for approximately three hours.”^{xxxii}

This quote, from the Australian National Fire Incident Statistics (1990-1991, 1991-1992) highlights the detail which can be accessed from the AIRS. Fire services need to take this information a step further and ask themselves the following questions:

“In what part of the community did these fires occur?”

“Where is the next fire most likely to occur?”

These questions should form the basis of a brigade’s community education programme. Education needs to be focussed on identified areas where fires are occurring, within a time-frame that sees the message given as relevant and applicable.

During 1991/92 in Australia, the majority of fire casualties occurred in one & two family dwellings, with the peak periods for the occurrence of fatalities being between 2300 2400 hours and 0300 and 0400 hours in the morning.

^{xxxii}ii -op. cit CSIRO. p. 7.

Children between the ages of 0 - 10 years and the elderly over the age of 60, both male and female, accounted for the majority of fatalities. These figures have remained constant over the last 3 years.^{xxxiii}

These figures would appear to show that target groups for education can be gathered from statistical data. This information, combined with data from AIRS can be used as a basis for targeting community education programs.

This approach is one that Australian Fire Services should look towards adopting, and in particular the ACTFB, who are targeting Community Education at Fire Wardens in Public Service buildings.

Given the National statistics on previous pages showing that deaths are occurring in the home and it is the young and elderly who are dying, it may be time to re evaluate the emphasis of community education in the ACT.

^{xxxiii} ii -op. cit CSIRO pp. 144 - 145.

“There are two kinds of success - initial and ultimate.”

Sir Winston Churchill 24th Feb. 1903.

SHORT TERM SOLUTIONS

Training

In 1992, the ACT Fire Brigade undertook a training program which saw each member of the brigade attend an in - house “Introduction to Fire Investigation” course. This was followed up by a “Report Writing” course conducted by the Australian Federal Police (AFP).

This training, along with specialist Fire Investigation training that has been provided to selected officers within the brigade, has laid the foundations for efficient fire investigations. It does not, however, go far enough to be able to support a system such as this report is suggesting. Further Fire Investigation training, and familiarisation with the AIRS system is required before the benefits can flow on to the community.

Memorandum of Understanding.

On 4th July 1994, the ACTFB assumed responsibility for providing details of most fires to the Coroner. The AFP still retain responsibility for providing details to the Coroner on:

- ◆ Fires which are of a suspicious nature or where a crime is involved
- ◆ Fires which involve death or serious injury
- ◆ Fires which result in large scale property damage to the community.^{xxxiv}

On the 18th of November 1994, a memorandum of understanding (MOU) was released between the ACTFB, AFP and ACT Coroner.^{xxxv}

^{xxxiv} ACTFB Staff Minute 1994/95 - 1.(Report of Fire to the Coroner.)

^{xxxv} ACTFB Staff Minute 1994/95 - 59 (MOU Investigation and Reporting of Fires)

The MOU details the responsibilities of each service involved, however, no framework exists to provide a structured response for a multi agency response to investigation.

Before the MOU can be truly efficient, *'Roles and responsibilities must be clearly identified'* in an approach similar to that taken by the UK Fire Services. Each service must be aware of each other's capabilities, and expertise. A 'team' approach must be taken to fire investigations, and to again quote the Home Office Circulars;

"The advantages of such teams are, in the Home Secretary's view, self evident; not only can they do much to promote cooperation and coordination at all levels between the police and fire services, but they also offer a means of more accurately identifying the causes of fires and, in the case of those fires thought to have been started deliberately, thereby assisting the police to bring the culprits to justice."^{xxxvi}

^{xxxvi} Home Office Circular 106/1992, Fire Service Circular 10/1992.

LONG TERM SOLUTIONS

Phased Response to Incidents.

Under the terms of the existing MOU, a phased, joint response does not exist. For Fire investigations to be effective, this needs to be looked at as a priority.

The 1st phase would be the Officer in Charge (OiC) of an incident. The responsibilities of this Officer would include:

- ◆ Determining cause and origin
- ◆ Accurate reporting of cause and origin.

The second phase of investigation will also involve a Fire Brigade Officer, who is responded when the OiC of phase 1 cannot determine the cause and origin, requires a second opinion, or as part of a predetermined attendance to the following incidents:

- ◆ Fires involving 3 or more pumping appliances
- ◆ Fires which reignite within 24 hrs of initial attendance
- ◆ Fires of special interest
- ◆ Fires involving, or reported to involve injuries or fatalities.

This Officer should hold the rank of District Officer or Station Officer Qualified, and should not be the OiC of operations at that particular fire. This officer should be in a position where he can follow the investigation through to a conclusion, even when responsibility for the investigation becomes a Police matter. The position will involve liaison with the AFP and other agencies involved in the investigation.

Once the investigation has been completed, the Investigator will then complete the areas of the AIRS report that relate to the cause and origin of the fire.

This will result in a report that is more accurate, and ultimately will lead to a more valid database, and *“The data can be used to indicate the need for changes in fire prevention practices, training and equipment needs and assist in educational programs.”*^{xxxvii}

The third phase of fire investigation should be where a full fire investigation is warranted, and when the Police assume responsibility for the investigation. A coordinated team approach should be adopted which includes the following members as required;

- ◆ ACT Fire Brigade, Fire Investigator
- ◆ AFP Crimes Scenes Branch
- ◆ AFP Forensic Services Division
- ◆ AFP Criminal Investigation Unit
- ◆ Other Services as required for investigation eg ACTEW, AGL. etc.

For this approach to be effective, regular liaison meetings will be required, and an understanding of each others roles, responsibilities, and abilities is essential. This has been achieved in part by the current MOU, and can be further enhanced by common and/or joint training approaches.

Following the completion of the investigation, the ACT Fire Brigade Officer will complete the areas of the AIRS report that relate to the cause and origin of the fire. Again, this will result in a report that is more accurate, and which leads to a more valid database.

^{xxxvii} ii op.cit. CSIRO p. 10.

Benefits of a phased response.

Phase 1 of the system will require no additional resources, and is identical to the system as it operates now. The only requirement will be further training in determining the cause and origin of fires as discussed on page 22. The flow on effect of this training should be a reduction in the amount of fires of unknown origin, and a database that is a more accurate reflection of what is happening in the community.

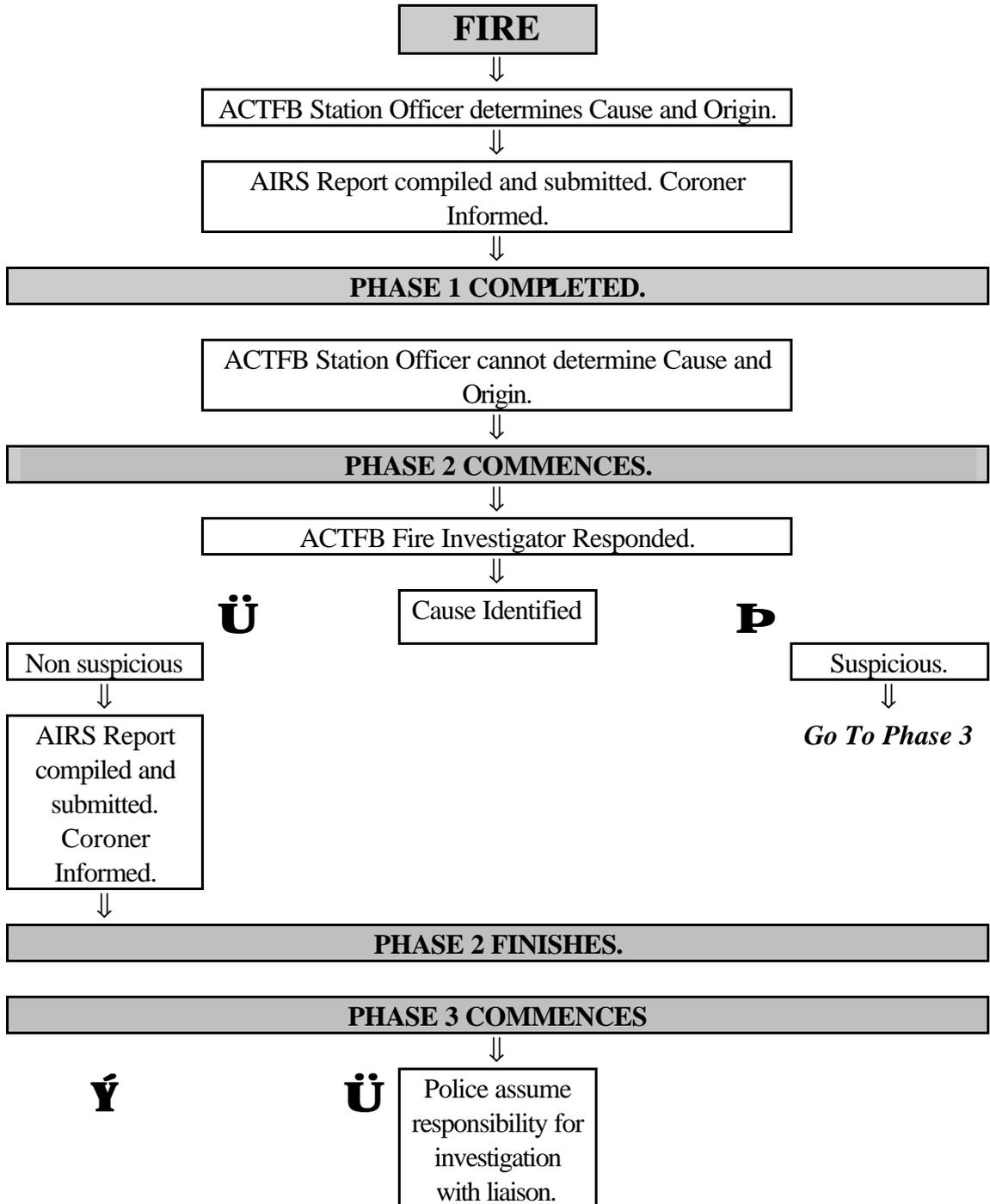
Phase 2 is the quantum leap in thinking for the ACT Fire Brigade. This phase will require Officers who are not the Operational District Officer to be responded to fires of certain criteria. The criteria for these fires is discussed on page 36.

Phase 3 relies on the successful implementation of phase 2. It also requires the agency's involved in the investigation working together, and continually liaising.

A flow chart of how the system would work is shown on the next page.

Phased Response Flow Chart.

Flowchart 1



CONCLUSIONS

After considering the facts, it would appear the major problems existing within the ACT with regards to Fire Investigation are as follows;

1. *Fires of unknown origin.*

The amount of fires being reported as of unknown origin in the ACT is too high.

The cause of this problem is not enough training for fire officers in fire investigation, a lack of awareness of AIRS and the lack of a phased response to investigate fires.

Without a structured response, the incidence of fires being reported of unknown origin will continue to be disproportionately high in the ACT.

2. *Liaison between agencies.*

There is insufficient coordination, liaison and planning between the agencies involved in investigating fires in the ACT.

The cause of this problem is the ACTFB lack of a structured response to the investigation of fires. Appointment of an ACTFB liaison officer for the AFP and other agencies involved in fire investigation must be a priority. In order for agencies to work together on the fireground, there needs to be contact prior to a fire occurring.

3. *Command and Control structure.*

The ACT Fire Brigade is unable to commit resources to respond to fire investigations within its existing structure.

The cause of the problem is the lack of a suitable command and control structure within the brigade that utilises Officers in all positions of responsibility.

4. *Legislative responsibility.*

The ACT Fire Brigade should have the legislative responsibility to provide a service to the community with regards to Fire Safety and Education.

Current resources restrict a coordinated approach to community education utilising standard curriculum. This is due in part to there being no program in place for targeting specific areas of the community, based on valid statistics. The areas within the community that are experiencing fires should be the areas receiving community education. A system whereby Fire Investigation results are mapped, trends analysed and education targeted where it is needed does not yet exist.

RECOMMENDATIONS FOR ACTION.

Based on the authors experiences and investigations whilst in the UK, Hong Kong and in the ACT, the following courses of action are recommended. These recommendations include short term measures, which should be implemented as soon as possible, and long term measures, which will need to be introduced gradually as circumstances permit.

1A. *To reduce the amount of fires reported as unknown.*

That an Officer be responded to fires of the type as detailed on page 36 and in Flowchart 1 (page 39). This would be an interim measure until a response system can be put into place.

The expected benefits of this short term measure would be a decrease in the number of fires being reported as of unknown origin. This officer should at a minimum have completed a currently recognised Fire Investigation course.

1B. *Training to Australian Fire Agencies Competencies.*

That initially all Station Officers and ultimately all Senior Firefighters Qualified, undertake training with AFC modules for fire investigation. These modules should include:

- 4.05A** Fire Investigation, Wildfire Origin and Cause Determination
- 4.05B** Fire Investigation, Structural and Vehicle Fire Cause Determination
- 4.06** Fire Investigation, Legal Procedure's.

These modules could be assessed as a joint training program between the ACT Fire Brigade and AFP.

The benefits of this programme would be long term, and would result in phases two & three of the fire investigation flowchart being utilised less due to more conclusive investigations and identification of cause and origin at Phase 1 by the OiC of the incident.

Other long term training should include Officers who are on a Command and Control roster for Fire Investigation duties undertaking training utilising the ACTRAC National Fire Technology curricula. This could be achieved within existing budgets if introduced over a period of time.

1C. *Awareness package for AIRS.*

That an awareness package be developed for the AIRS which includes its history, its operation, its uses and its benefits. This package would be aimed at Station Officers, District Officers and when possible, Senior Firefighters Qualified.

The benefits of this program would be realised in the short term, and not just in the field of fire investigation. It would give officers making reports a better understanding of the system, which will lead to valid reporting and more accurate statistics.

2A. *Implementation of Response Flowchart.*

That the response flowchart suggested in this report for Fire Investigations be adopted and implemented.

The benefits of this short term measure would be a step in the right direction for improving the existing MOU for fire investigation. This step will ensure that the implementation of the recommended long term measures will be effective.

2B. ACTFB Liaison Officer.

That an Officer be assigned as liaison officer with the AFP Forensic Services Division, and other agency's involved with fire investigation.

The benefits of this short term measure will ensure that there is contact, coordination and liaison prior to it being needed on the fireground. In the long term, this system may eventually lead to the formation of a body such as the Major Fire Response Group as detailed in Appendix D.

3A. Command Structure and Roster.

That a command structure be adopted for the ACTFB for the coordinated response of Senior Officers to incidents.

This short term measure will have long term effects and not just in the field of fire investigation. Officers on a duty roster should be assigned functional responsibilities at incidents, and should be responded as required to incidents.

This measure will result in the Operational District Officer, acting as Incident Controller, being able to coordinate an incident more effectively, and will allow Superintendents to sectorise incidents with Officers as Sector Commanders should the incident escalate.

The overall result of this measure will be an improved operational capability for the brigade, as well as for the individual officers who otherwise may not have been responded to an incident.

3B. Designated Fire Investigation Coordinator.

That an Officer be appointed as Fire Investigation Coordinator.

This long term measure would see an Officer with responsibility for liaison between services, training and coordination of assessments for operational staff undertaking fire investigation modules. The officer will respond to incidents when required under the proposed command structure and issue media releases concerning fires under investigation.

The cost of this measure, if done in conjunction with a different rostering system, should not incur any unreasonable additional expenses (See Appendix C for guide).

3C. Utilise statistics gathered for Community Education programs.

That the Officer responsible for Fire Investigation Coordination, as described in 3B, compile monthly reports on fire trends and the areas that fires are occurring in. This information should be utilised by the community education department to target areas for education.

The benefits of this measure will see education being given to community sectors where fires are occurring, and within a time-frame that sees the message being pertinent and applicable.

4. Community Education as a Statutory Responsibility.

That the ACTFB lobby the Legislative Assembly to have Community Education become a legislative responsibility of the ACT Fire Brigade under the Fire Brigade Act 1957. This legislation could provide the basis for funding to set up and maintain a scheme for community education initiatives.

The benefits of this long term measure would be that this legislation could become the basis for a number of initiatives which should include:

- ◆ Training for existing and future firefighters and Officers in the skills necessary to deliver training at all age levels.
- ◆ Development of standard curriculum packages suitable for Primary school, Secondary school and Colleges with a message that is constant throughout each level.
- ◆ An education package for community health workers to target fire safety for the elderly.

Results

After a thorough investigation of the situation regarding fire investigations in the ACT, United Kingdom and Hong Kong, it is recommended that this report be implemented in its entirety. This action would result in the following short and long term results.

Short term

The use of an ACTFB officer to attend fires where the cause and origin cannot be initially determined will have immediate benefits for the ACT Community. This action would result in a decrease in the number of fires of unknown origin, and would put the ACTFB in a position where it may more accurately identify fires of suspicious origin.

This will result in the ACTFB being able to pass all relevant information to the Police, which will aid ensuing investigations. In addition to this, if the ACTFB is able to adequately determine the fire cause as being accidental, valuable Police resources will be saved and can be channelled into other areas of the community.

The adoption of a pre incident Command and Control structure, similar to the one suggested in this report and already utilised to good effect in the UK, will allow a designated Fire Investigation Officer to attend fires as part of a pre determined attendance. When the officer is responded to the incident as early as possible in its development, and is able to observe the behaviour of the fires progression, a more accurate determination of its cause and origin will result.

The ACTFB's Fire Investigation Officer will become the focal point for the media with regards to incidents, fire safety issues, and the publics perception of the ACTFB's operational capability.

This officer will have a high degree of control over information that is released to the media with regards to fire cause and origin, and will be the link between all services involved in fire investigation liaison.

Long Term

The ACTFB's Fire Investigation Officer will facilitate liaison between the services involved in fire investigations, which will lead to joint investigations, particularly between the Police and Fire Brigade.

Further Fire Investigation training for ACTFB Station Officers will result in the data entered into the AIRS database becoming a closer reflection of what is happening at fires within the community.

Given that the database is accessed nationally, the extensive and detailed information that is gathered from fire investigations makes it possible, and practical, to achieve one of the CSIRO's goals of having data to develop performance based regulations upon. These regulations will come directly from the information gathered by fire services through fire investigations. Without adequate input from the grass root levels, national standards may be misleading due to invalid data.

If the ACTFB had the legislative responsibility to educate the public on fire safety related topics it would be in a position to utilise Fire Investigators within its Command and Control structure, and provide the ACT Community and Government, with a return for their money. This can be achieved by utilising the results of fire investigations to target community education projects. This will result in the ACTFB becoming proactive, and attempting to prevent fires from occurring rather than curing the aftermath.

Summary

These results, both short term and long term, can only come about if the ACTFB adopts a coordinated approach to fire investigation.

If the recommendations suggested in this report are implemented, they will help to meet one of the objectives found in the ACT Emergency Services Bureau's "Draft Corporate Plan".

Part of the Bureau's ten year plan is to provide "**Service to the Community**", and the plan states that;

"Within ten years We are aiming for a fully integrated, highly skilled Bureau operating within appropriate legislation and working with a fully prepared community."

Working towards that objective over the next year we will ...

- * *put mechanisms in place to facilitate community feedback and education*
- * *have an increased community profile / liaison.^{xxxviii}*

This report provides a blueprint that will ensure this objective is met and that;

**"The results of Fire Investigations can benefit the ACT
Community."**

^{xxxviii} ACT Emergency Services Bureau. Draft Corporate Plan 1995.

Glossary of Terms.

ACTFB	Australian Capital Territory Fire Brigade.
ACTRAC	Australian Committee for Training Curriculum.
ACTEW	Australian Capital Territory Electricity & Water.
AFACS	Australian Fire Agencies Competency Standards.
AFP	Australian Federal Police.
AGL	Australian Gas Light.
AIRS	Australian Incident Reporting System
CBT	Competency Based Training.
CD - ROM	Compact Disk - Read Only Memory.
CFBAC	Central Fire Brigades Advisory Council.
CID	Criminal Investigation Division.
CSIRO	Commonwealth Scientific & Industrial Research Organisation
DUS	Department of Urban Services.
FDR1	UK National reporting form for all fires.
ISD	Incident Support Duties.
ISD	Incident Support Unit.
LFCDA	London Fire & Civil Defence Authority.
MOU	Memorandum of Understanding
OiC	Officer in Charge.
PDA	Pre determined attendance.
Secondary Fire	Secondary fires are those involving only single derelict Buildings, single buildings under demolition or such outdoor locations as grassland, railway embankment or refuse.
SOCO's	Scenes of Crimes Officers.
YFA	Young Firefighters Association.

Risk Categories

Category A risk areas are normally to be found in the largest cities or towns. Examples include main shopping and business centres, concentrations of theatres, cinemas and other entertainment centres, or of high risk industrial property.

Category B are normally to be found in the larger cities or towns not falling within category A. Examples include smaller scale shopping and business areas, concentrations of hotels and leisure facilities in large resorts, concentrations of older, multi storey accommodation, and industrial and trading estates with some higher risk buildings.

Category C are normally to be found in the suburbs of the larger towns and parts of smaller towns with built up areas of substantial size. Examples include post war housing developments such as terraced and multi storey dwellings, deck access and blocks of flats or areas of suburban terraced, semi detached and detached residential properties.

Category D includes all areas other than Remote Rural not falling within categories A to C.

Remote Rural areas may be classified Remote Rural if they are isolated from centres of population and contain few buildings.

Special Risks A subsidiary risk classification for small areas, whether comprising single buildings or complexes, which need a first attendance over and above that appropriate to the risk which predominates in the surrounding area. There are many different types of Special Risk, but some typical examples include hospitals, prisons, airports, tower blocks and major petrochemical plants.^{xxxix}

^{xxxix} i op. Cit. The Audit Commission. p. 13.

Risk Category Attendance.

<u>Risk category</u>	<u>Number of Pumps</u>	<u>Time limit for 1st attendance.</u>		
		<u>1st</u>	<u>2nd</u>	<u>3rd</u>
A	3	5	5	8
B	2	5	8	-
C	1	8-10		
D	1	20 ^{xl}		

^{xl} i ibid p.14.

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Appendices.

Appendix A	The Fire Service College
Appendix B	West Midlands Fire Service
Appendix C	Nottinghamshire Fire and Rescue Service
Appendix D	Strathclyde Fire Brigade
Appendix E	Lothian and Borders Fire Brigade
Appendix F	Tyne and Wear Metropolitan Fire Brigade
Appendix G	Cleveland County Fire Brigade
Appendix H	London Fire Brigade
Appendix I	Hong Kong Fire Service
Appendix J	UK Flexible duty system

THE FIRE SERVICE COLLEGE

FIRE INVESTIGATION COURSE

The College

My project started with a five day Fire Investigation course at the Fire Service College, Moreton in Marsh. The College trains over 6000 individuals a year in fire, safety and emergency skills and offers over 250 different courses each year.

The Fire Service College is situated on a 550 acre site incorporating a number of full scale buildings in which fires can be set during exercises. These buildings include industrial units, a house, a 5 storey shopping complex, a 4000 tonne cargo ship, a chemical plant and a simulated motorway. (See Picture 1)

The courses it provides are facilitated by uniformed training officers selected from the UK Fire Brigades. These officers have vast operational experience which is supplemented by over 150 visiting lecturers from Universities, colleges and industry.ⁱ

The course

The aim of the College's Fire Investigation course is to provide the student with an understanding of the principles of fire investigation which will compliment experience gained on the job.

The course also aims to provide interaction between students from the Fire Services, Police and Scenes of Crime Departments *prior* to them working together at fire scenes.

The course participants included officers from 22 different Brigades within the UK, an officer from Cyprus, Scenes of Crime Officers from 2 Police Forces in the UK, and myself.

ⁱ The Fire Service College, Promotional brochure. The Artwork Company Ltd. England.

The topics covered by the course included;

- Physics and Chemistry of Fire
- Role of the analyst in Fire Investigation
- Fires in furniture
- Electricity
- Spontaneous and smouldering combustion
- Legislation
- Locating the seat of fire
- Recording of information
- Vehicle fires
- Expert evidence, hearsay and case law
- Fire investigation teams
- Burning characteristics of timber
- Investigations into the cause of fire.

The course was structured around a number of tutorials, provided by visiting lecturers from various organisations in the UK. These included Mr Roy Cooke, from Dr JH Burgoyne & Partners, Consulting Scientists and Engineers, Explosives experts from the British Army, lecturers from the Fire Research Station, and a Fire Investigator and Scenes of Crime Officer from West Midlands.

Throughout the course, participants were asked to provide case studies of fires they had attended. These case studies were then discussed within the group which resulted in a number of lively discussions as to the cause and origin of some of the fires.

Being the only non assessable course left in the Colleges curriculum, the course appears to have suffered from a lack of emphasis and I am told it has changed little over the years.

During the course debrief, a number of participants expressed concern for the future of the course, and the consensus of the group was that the course would need a total revamp to regain its status as the leading Fire Investigation course in the UK.

The course reinforced my belief that Competency Based Training is the way of the future, particularly with a subject like Fire Investigation that relies on experience, combined with underpinning knowledge, for a successful outcome.

Given that the college has arguably the best facilities in the UK for hot fire training, it is a waste of resources not to use those facilities in conjunction with the Fire Investigation course to give participants the hands on experience, albeit under contrived circumstances. Hands on experience is definitely required to be a successful investigator into the cause and origin of fires.



PICTURE 1

Firefighting facilities at the Fire Service College could be used in conjunction with the Fire Investigation course to add much needed hands on experience.

WEST MIDLANDS FIRE SERVICE

THE BRIGADE

Area

The West Midlands Fire Service covers the Metropolitan Districts of Birmingham, Solihull, Wolverhampton, Coventry, Walsall, Dudley & Sandwell.

With a population of over 2.7 Million to protect, the brigade is one of the largest in the United Kingdom.

The brigades operational area covers 890 square kilometres, which is densely populated, but also contains numerous heavy industrial sites, including 4 major international car manufacturing plants.

The brigades operational area is divided into 5 divisions, each division being headed by a Senior Divisional Officer (SDO). Each SDO is supported by 5 Assistant Divisional Officers (ADO), 1 for each watch and 1 in charge of Fire Prevention in each division.

Staff

Protection of the brigades area is achieved with a strength of 2185 firefighters operating from 41 stations, 40 of which are manned with Wholetime personnel, and 1 with retained personnel.

Budget

The brigades total expenditure for the year 1993/94 was £69 660 032

(\$A154 800 000) This figure represents a net expenditure per head of population of £25.85 (\$A57.44).ⁱ

ⁱ West Midlands Fire Service. 1995. Annual Report 1993 / 94.

FIRES AND FATALITIES

During the year 1993 / 94 the brigade attended 83 870 emergency calls, 20 545 of which were fires.

Fires in the West Midlands area resulted in 35 fatalities in 1993, and 28 fatalities in 1994. A disturbing trend with regards to these figures is that of the 1993 fatalities, 29 occurred in residences, and of the 1994 fatalities, 20 were in residences. The majority of these were in terraced houses, flats or semi - detached houses. Although high, these figures are a reduction from previous years. (See table 1).

These reductions have been heralded as positive evidence that the fire safety initiatives initiated by the West Midlands Fire Service are; *“Proving effective and beginning to pay off”*ⁱⁱ



ⁱⁱ Watkins D, Hutton P. West Midlands Fire Service 1995. Fatal Fires in the West Midlands 1993 & 1994.

SUMMARY OF FIRES

	ARSON	NATURAL	FATAL	UNKNOWN	TOTAL
1984	229	138	40	28	395
1985	286	168	38	10	464
1986	400	232	43	5	637
1987	375	159	37	12	546
1988	289	168	43	5	462
1989	274	136	46	4	414
1990	344	153	35	0	497
1991	267	133	49	6	406
1992	269	156	58	4	429
1993	239	108	35	0	347
1994	242	109	28	4	355

Table 1**10 YEAR TREND 1984-1993**

ARSON	NATURAL	UNKNOWN	TOTAL	FATAL
2972	1551	74	4597	452

Table 2ⁱⁱⁱ

ⁱⁱⁱ ii op.cit p.p. 7-8.

FIRE RESEARCH AND INVESTIGATION TEAM (FRIT)

The West Midlands is one of only two brigades in the UK who currently utilise a full time Fire Investigation Unit who are utilised where OiC's cannot determine a fire cause.

The unit was founded in the 1980's following prompting from the Home Office regarding the increase in fires being determined as "Unknown Cause".

The introduction of the FRIT has had a direct result upon the number of fires being classed as "Unknown". This reduction can be seen in Table 1.

The Fire Research & Investigation Team (FRIT) is based at Fire Services HQ in Birmingham, and comprises of 5 Station Officers on a watch system providing 24 hour availability to the West Midlands. The section is automatically mobilised by the Duty Fire Control Officer to incidents falling within the following categories;

- * fires involving the use of 4 or more pumping appliances
- * all fatal fires
- * all multi fatality (3 or more) special services calls to act as coordination and liaison officer.
- * any recall or reignited fire. (these reports are sent to the Officer in charge of Operations).

The section can be mobilised upon the request of the Officer in Charge (OiC) of an incident when;

- * there is a likelihood of a fatality occurring as a result of injuries received.
- * fires of doubtful origin where the cause cannot be readily identified.
- * deliberate fires of a serious nature.
- * all fires which are as a result of an unlawful act.
- * all fires where there may be political or public sensitivity.
- * all fires where the OiC considers them of special interest, peculiar or

- * a 2nd opinion is required.

Fire Investigation Training

Fire Investigation training includes a small component (4 Hours) in the Junior Officers and Junior Officers Advancement courses which are held at the Fire Service College.

The West Midlands also send members of Station Officer and above to the 1 week Fire Investigation Course which is also held at the Fire Service College. Officers from the FRIT act as visiting lecturers during the Fire Investigation course at the college, and present a joint session with a SOCO from West Midlands police.

In house training and lectures are conducted by members of the FRIT for the brigade and other services within the West Midlands.

Officers from the Operations section, and Scenes of Crimes Officers (SOCO's) regularly work with the FRIT to gain further valuable experience in the field of Fire Investigation. Experience appeared to be the key factor that made the West Midlands FRIT successful.

The brigade is also represented on the National Fire Investigation Working Group which is discussing a proposed Research Protocol for Fire Investigation.

COMMUNITY EDUCATION

A large proportion of fires in the West Midlands have been determined as being of malicious origin. This has led to the introduction of a number of community based initiatives including;

“*And on the Third Day*” A major schools initiative in conjunction with the West Midlands Police. The program is an attempt to reduce arson attacks on schools, and reflects the fact that a school fire was occurring every three days.

It still remains to be seen if the program has had a positive effect.

A fire setter counselling programme aimed at providing support and counselling for young fire setters.

A National curriculum support project using “Learn not to Burn” packages in all schools. This project is supported by Community Relation Officers and incorporates a Fire Safety Bus to travel to schools for displays.

To effectively apply these initiatives, and others that are being utilised, the brigade requires input from the Fire Investigation and Research Team (FRIT) to identify trends in the occurrence of fires, and direct community education where it is required.

NOTTINGHAMSHIRE FIRE AND RESCUE SERVICE

THE BRIGADE

Area

The Nottinghamshire Fire & Rescue Service (NF & RS) provides fire and rescue protection for the county of Nottinghamshire which is located in the Central Midlands of England. The county covers an area of 2100 square kilometres. Central to the county is the city of Nottingham which boasts a population of just over 600,000. The total population of the county is close to 1 million.

Staff

Fire protection for the county is achieved with 26 stations, 12 stations are staffed with Wholetime firefighters, and 14 with retained firefighters. Staffing levels are 600 whole time personnel and 400 retained personnel.

FIRES AND FATALITIES

During the year 1994, the brigade attended a total of 18,635 calls for assistance. 8773 of these calls were fires, 7527 were false alarms, and 2335 were special service calls.

Of the fires, 3544 were primary fires, 4744 were secondary fires and 485 were chimney fires.

For the year 1993/94, fires resulted in 7 fatalities, and 362 serious injuries within the brigades area.ⁱ

ⁱ Nottinghamshire Fire and Rescue Service, Incident Summary 1993 and 1994.

FIRE INVESTIGATION TEAMS

Fire investigation in Nottinghamshire may be carried out at any of two levels depending upon the seriousness of the fire.

Level 1 is by the Officer in Charge of an incident and covers the majority of fires attended by the brigade where the cause is obvious, and a conclusion can be reached without excessive delay to operational crews and appliances.

Level 2 is by a fire investigation officer who is responded automatically under the following circumstances;

1. Fires involving fatalities or serious injuries.
2. Fires where brigade personnel are seriously injured as a consequence of fire.
3. Fires involving the use of five or more pumping appliances.
4. All recall incidents.
5. Fires of special interest.

Fire investigation officers will also be mobilised upon the request of the OiC of an incident to;

1. Fires where there is a likelihood of a fatality occurring as a result of injuries received, in particular serious burn cases.
2. Fires of doubtful origin where the cause cannot be readily identified.

The NF & RS has a full time Fire Investigation coordinator who is attached to the Fire Safety section. The coordinators position is at the rank of Assistant Divisional Officer (ADO), and is responsible to the Assistant Chief Officer, Fire Safety and Technical Services.

The job involves the coordination of a team of 6 part time fire investigators, formulating statistics and identifying trends, preparing cases for possible prosecution and fire investigation training. The coordinator is also part of a scheme which councils young children caught lighting fires, which is run in conjunction with the Police.

Presently the investigators include 2 Station Commanders of ADO rank, 1 Fire Safety ADO & 3 day shift Station Officers, who are recalled from other operational and non operational areas as required. A duty roster is maintained by the coordinator to ensure that at least 1 investigator is always on duty in the brigade over any 24 hour period. Where this is not possible, investigators may be recalled via pagers.

In 1994, investigators attended 70 investigations (less than 2% of primary fires), 11 of which required the recall to duty of an investigator. Investigations accounted for 450 hours of work, and each investigation took an average of 6.4 hours, at a cost of £83.00 (\$A180.00). (*Based on Assistant Divisional Officers wage on flexible duty*).ⁱⁱ

Equipment

All on call investigators are issued with the following equipment to assist during fire investigations;

- Fire Investigator Tabard

- Hard Hat

- Distinctive overalls

- Tool Kit including:

 - Electrical tester

 - Pointed trowel

 - Screw drivers

 - Nylon and plastic bags

 - Proforma prompt sheets (see page v) and clipboard

 - Lighting Kit

ⁱⁱ Nottinghamshire Fire and Rescue Service, Fire Investigation Statistics 1994.

Mobile Phone

Fire Investigation Training

To ensure continuity of the Fire Investigation team, an observers scheme is maintained, and officers who have expressed an interest in being part of the fire investigation team are placed on a reserves list. When a fire occurs which requires the attendance of a fire investigator, the reserve is contacted and asked to attend to gain on the job experience.

Where a fire occurs within the operational area of an on duty fire investigator, wherever possible, a second call investigator will be mobilised to the scene so as not to interfere with the on duty officers primary operational requirements.

To qualify for a position on the fire investigation team, members must have had at least 2 years experience on the flexible duty system, and must have successfully completed the Fire Investigation course and Fire Safety course at Moreton in Marsh.

A training objective has been determined by the brigade which aims to improve the quality and standards of fire investigation. The coordinator is responsible for ensuring that personnel receive adequate training in carrying out investigations, and with the assistance of team members, the following training is conducted at frequent intervals;

Recruits.

To ensure firefighters are aware of their responsibilities in respect of scene preservation and to develop their powers of observation as a potential witness.

Operational personnel.

To ensure that Officers in Charge are aware of the basic principles of fire investigation and are capable of carrying out elementary investigations before calling for the fire investigation team.

Supervisory Officers and Fire Investigation team members.

To ensure that officers having supervisory responsibilities for fire investigation receive suitable continuation training appropriate to their responsibilities.

Other agencies.

To ensure fire investigation officers offer advice / training to other organisations with the sole purpose of promoting the brigades objectives.

STRATHCLYDE FIRE BRIGADE

THE BRIGADE

Area

The Strathclyde Fire Brigade covers the Strathclyde Council area of Scotland. Its Headquarters are based in Hamilton and the Brigade is divided into 4 operational commands.

Central Command

Located in the City of Glasgow, Central Command covers an area of 765 square kilometres and protects a population of more than 1,071,119 people. Districts included in its area are Bearsden & Milngavie, City of Glasgow, Cumbernauld and Kilsyth, Eastwood, Strathkelvin, and parts of Renfrew.

Its 1250 personnel and support staff operate from 21 Wholetime and 2 retained stations.

West Command

This command protects an area of 3000 square kilometres and a population of 544,512.

West Command covers the districts of Cumnock and Doon Valley, Cunninghame, Inverclyde, Kilmarnock and Loudon, Kyle and Carrick and a part of Renfrew.

There are 8 Wholetime stations, 20 retained stations and 3 volunteer units.

East Command

This command protects an area of 4530 square kilometres and a population of 499,400.

East Command covers the districts of Hamilton, Motherwell, Monklands, East Kilbride and Clydesdale. The operational function of the command is served by 6 Wholetime stations, 8 retained stations and 1 volunteer unit.

North Command

This command protects an area of 7010 square kilometres, a population of 192,820, and has a coastline of 3,680 kilometres to protect.

North Command covers the districts of Clydebank, Dumbarton, Helensburgh, and Argyle and Bute.

Operational cover is provided by 3 Wholtime stations, 14 retained stations and 27 volunteer units.

Staff

The Brigade has a total of 3056 staff, which is made up of 2173 Wholtime members, 586 retained members, 231 volunteer members, and 66 control room staff.

Budget

The Brigade has an annual budget of £80.36 Million (A\$174.6 Million), 82% of which is spent on employee costs.ⁱ

FIRES & FATALITIES

For the year 1994 / 95 the Brigade attended 64,057 fire calls. 29,838 of these calls were fires, 4297 were special services, 5606 were other incidents and 24,316 were false alarms or malicious calls.

Fires accounted for 42 fatalities, 893 injuries and resulted in 795 rescues being effected.ⁱⁱ

ⁱ Strathclyde Fire Brigade. 1995. Annual report of the Firemaster of Strathclyde. 1994/95. Strathclyde Regional Printing Works.

ⁱⁱ *ibid.* p. 17

Last year the brigade attended over 10,000 fires in heritage buildings and property. Of this figure, some 4000 were attributed to wilful fire raisingⁱⁱⁱ and less than 1.5% were recorded as having an unknown cause. The brigade claims that these figures are attributable to a systematic investigation of the events by fire investigators.^{iv}

FIRE INVESTIGATION TEAMS

Strathclyde Fire Brigade has implemented a Fire Investigation Group. The role of the group is to assist, improve and maintain the brigades standard of fire investigation. The group is made up of 30 flexible duty senior officers who have had specialist training in Fire Investigation, and a Fire Investigation Liaison Officer. The Brigade takes a positive approach to Fire Investigation, and has a rate of only 0.2% fires recorded as being of unknown origin.

Investigating Officers are responsible for ensuring that “*an efficient and standardised Fire Investigation procedure is operated in all divisions of the Strathclyde Fire Brigade.*”^v

Investigating officers are mobilised by Brigade control to the following incidents;

1. Fires of 5 pumps or more.
2. Fires involving more than 1 fatality.
3. On the direction of the Principle Officer.
4. On the request of the Officer in Charge of an incident.

If the officer in charge of Command & Control functions at an incident is also the nominated Fire Investigation Officer on the duty roster, then he may if he wishes, request another Fire Investigation Officer to attend to carry out investigations.

ⁱⁱⁱ Wilful fire raising equates to Arson.

^{iv} i ibid. p.15.

^v Strathclyde Fire Brigade Operational Note, “Fire Investigation Group”

The Fire Investigation Liaison Officer holds the rank of Senior Divisional Officer, and reports directly to the Firemaster under the Brigades structure. His role is to facilitate the and coordinate the following functions;

1. Training of Fire Investigation Officers.
2. Administration of fire investigation reporting.
3. Maintaining an overall view of certain types of incidents within the brigade and reporting on such to the Firemaster.
4. In consultation with Divisional Commanders, assessing what resources and manpower may be required for a specific investigation.
5. Maintaining links with Senior Police Officers nominated by the Chief Constable for fire investigation liaison.
6. Advising Fire Investigation Officers, where necessary, on specific problems.
7. Maintaining a library of Fire Investigation reports and exhibits for ongoing training.

A comprehensive Operational / Technical note has been developed to ensure a standardised approach to fire investigation throughout the Brigade. Standard forms have been produced and include the following;

1. A Fire Investigation report for submission to the Police via the Firemaster.
2. Fatal fire reports when required.
3. Narrative pages.
4. Incident scale drawings.
5. Fire service personnel witness statements.
6. Work sheet and Aide Memoir.

The Fire Investigation Liaison Officer is responsible for the processing and forwarding of all reports to the Police and / or Procurator Fiscal.^{vi}

Reports may also be forwarded to;

1. The person who occupied / owned the property or their legal representative &
2. Any other interested parties (if the owner / occupier gives written permission).

These reports are released on a cost recovery basis.

MAJOR FIRE RESPONSE GROUP (MFRG)

The MFRG came about as the result of operational requirements of both the Fire Service and Police, and includes the fraud squad, major insurance companies, loss adjusters, forensic scientists and local authorities.

In the UK, it is believed that at least 30% of all fire losses were due to fires started by or on behalf of an insured party.^{vii}

An operational strategy for the investigation of major wilful or fraudulent fires in the Strathclyde area was devised and implemented in 1994 following the strategy that was used during an investigation into a fire at Lomond Castle Hotel in 1991. The main objective of the group is to discuss the possible joint improvement of criminal investigations into major wilful or fraudulent fires.

The main catalyst for change has been the dissatisfaction with the way major fires were being investigated by all parties involved;

^{vi} Scottish Equivalent of Australia's Coroner.

^{vii} Strathclyde Police and Insurance Liaison Group April 1995. Sharing responsibility to stop fraud, *Section 2 Wilful or Fraudulent Fires*, p.8.

“The consensus of opinion was that investigations appeared disjointed, lacked a cohesive approach, required streamlining and as a consequence evidence was being lost not only at the scene but during the investigation as a whole”.^{viii}

The Senior Police Investigator will lead the investigative meetings to ensure a coherent, efficient and effective approach to the investigation, and it is hoped that the strategy will allow for the free exchange of information between all groups involved leading to improved investigative techniques.

Any member of the group can request a meeting of the MFRG at any given time in an effort to expedite the investigation. The criteria for activating the group is;

- * A Major wilful or fraudulent fire.
- * Where greater consultations are required urgently.
- * Where evidence would be lost by failing to expedite.
- * Where there may be a need for the investment of monies by Insurance Companies to preserve evidence.

The Liaison Group General Committee, which surprisingly does not have Fire Service representation, meets every 6 months, and the MFRG meets annually or within 24 hours if operationally required.

^{viii} vi op. cit. Strathclyde Police and Insurance Liaison Group p.8.

LOTHIAN AND BORDERS FIRE BRIGADE.

THE BRIGADE

Area

Lothian and Borders Fire Brigade is based in Edinburgh, Scotland's Capital City. The brigades operational area covers 6475 square kilometres which contains a population of 850,000. The majority, 450 000, of the population reside in the city of Edinburgh.

Staff

The brigade has a staffing level of 738 whole time and 295 part time personnel located throughout its 35 stations. Operational cover is provided by 10 Wholetime, 3 Wholetime / retained and 22 retained stations.

FIRE AND FATALITIES

The Lothian and Borders brigade responds to an average of 18,000 calls per annum, 28% of which are classified as being of malicious origin.

The brigade recorded 20 fire fatalities during 1993, an increase on the 1992 figure of 13. The average age of fire fatalities was 56.3 years.ⁱ

FIRE INVESTIGATION TEAMS

Lothian and Borders has adopted a multi tiered approach to fire investigation. The first tier involves operational personnel of Station Officer rank who have attended an internal 1 week

ⁱ Gibb M. 1992. 1992 Fire Statistics, Lothian and Borders Fire Brigade.

training course. These operational personnel have responsibility for the routine investigation as Officer in Charge (OiC) of an incident.

Officers are instructed not to request fire investigators if they are themselves capable of continuing the investigation to a close.

The second fire investigation tier is Officers of Assistant Divisional Officer (ADO) rank on flexible duty rostered as fire investigators on a daily basis as part of the Brigade Command Structure

These nominated officers have completed the brigades in house fire investigation training course, the 1 week Fire Service College course, and / or a 1 week course conducted by the Edinburgh University.

Fire Investigators of ADO rank will be required to attend incidents where;

1. 4 or more pumps are attending.
2. Fatalities have occurred.
3. Attendance is requested by the Police.
4. The fire presents new or unusual features or which reveals the development of new structural or occupational hazards.
5. A contravention of the Fire Precautions Act is suspected.
6. A request is made from the OiC at an incident where there is difficulty establishing a cause of fire.ⁱⁱ

The third tier is termed a Full Fire Investigation, and is a multi disciplined fire investigation team which includes as many fire investigation officers as required, Police, Forensic Science Service and other assistance as requested.

When Full Fire Investigation is requested, Brigade Control will inform the Duty Officer to ensure that the fire investigation kits are mobilised. (see Equipment). The Duty Officer will

ⁱⁱ Lothian and Borders Fire Brigade. Fire Investigation Manual, Investigations into the causes of fire. - p. 53.

then mobilise a second fire investigator to assist. The brigade photographer will also be mobilised to assist in the investigation.

The FDR 1 will not be completed until the OiC is informed of the cause of fire by the fire investigators. This information will be passed on within 4 days of the investigation commencing.

Equipment

ADO's on fire investigation recall are issued with the following equipment to assist them with fire investigations;

- Conference file
- Note book
- Aide for fire investigators
- Pocket guide
- A4 graph paper
- Mains test screwdriver
- Small shovel *and*
- Use of operational appliances and equipment.

The full fire investigation kit, which will be transported to an incident on request, contains the following equipment;

Photographic equipment

- Camera and case
- Notebook
- Electronic flash gun

Miscellaneous

- Nylon waterproof jackets
- Fire Investigation tabards
- Torches and spare batteries

Graph pads
Sketch pads
Pencils, pens, rubbers
Clipboards
Notebooks
Identification labels
Polythene, nylon and paper bags

Hand Tools

Drager “Accura Pump” with hydrocarbon detection tubes
Hacksaw and blades
Insulated pliers
Screwdrivers
Stanley knife
Scrapers
Small shovels
Tape measure
Compass
Magnifying glassⁱⁱⁱ

The Brigade has two Full Fire Investigation kits, one held in the control room and one held on the Mobile Control Unit.

The kits were partly funded by a grant from the Factory Mutual Insurance group.

ⁱⁱⁱ ii op. cit. Lothian and Borders. p.p. 56 - 57.

COMMUNITY EDUCATION

Lothian and Borders takes a proactive approach to “putting out fires before they occur”. The Brigades ultimate aim is to see Fire Education become an established and integral part of a child’s schooling, particularly in areas where statistics give cause for concern.

4 levels of school based Community Education have been instigated;

- Level 1** An early learning project over 3 stages. A resource pack is used during lessons then the class is visited by a Community Education Firefighter, and an operational appliance.
- Level 2** An in depth project held over 5 stages including a mobile classroom and input from a professional teacher.
- Level 3** A 2 stage project with input over a 2 week period. The project is Social Education based using role plays and presentations in class.
- Level 4** A one stage project aimed at influencing the attitudes and behaviour of tomorrows adults.^{iv}

Fire incident statistics are recorded for the Lothian and Borders area, then broken down into the Postcode areas that the incidents occurred in. Schools are identified within those Postcode areas and targeted for Community Education. The strategy is reviewed yearly, and tailored to meet the communities needs where fires or malicious calls are most prevalent.

This strategy has resulted in a decline in the number of malicious false alarms in targeted areas.^v

^{iv} Lothian and Borders Fire Brigade. Fire Education Programme.

^v i op. cit. Gibb M. p.1.

TYNE AND WEAR METROPOLITAN FIRE BRIGADE

THE BRIGADE

Area

Tyne and Wear Metropolitan Fire Brigade covers the district councils of Newcastle, North Tyneside, South Tyneside, Sunderland and Gateshead. The brigades area is a mixture of high density housing, a declining manufacturing industry and city centres, including the largest shopping precinct in Europe.

Operationally, the Brigade is made up of two divisions, within these divisions are 8 district offices strategically located throughout the communities they serve. The brigades area is 538 square kilometres, which contains a population of 1.4 million.

Staff

The brigade has 18 stations, 9 in each division, and a uniformed staffing level of 1139 personnel.

Budget

The brigades budget for the year 1993 - 94 was £37,744,533 (\$A 82,053,330). This equates to £29.25 (\$A63.58) per head of population. Personnel costs account for 84% of the brigades budget.

FIRES AND FATALITIES

For the year 1993/94, the brigade attended 34,252 incidents, 18063 (52.7%) of which were fire calls, 13,964 (40.8%) were false alarms, 2,225 (6.5%) were special service calls.ⁱ

ii

ⁱ Tyne and Wear Fire and Civil Defence Authority 1994. Annual Report and Abstract of Accounts, 1993 / 94 Tyne and Wear Metropolitan Fire Brigade

Of great concern for the brigade is the statistic showing that 20,785 (61.1%) of calls attended to by the brigade were malicious in origin. 14,827 of the fires attended to by the brigade were determined to have been started maliciously, the remaining calls were malicious false alarms.

Of the 2443 fires reported in residential dwellings, 287 had the cause determined as being of unknown origin, and 1286 were reported as being of malicious origin.ⁱⁱⁱ

FIRE INVESTIGATION TEAMS

Tyne and Wear has recently implemented a proactive approach to Fire Investigation.

Three levels of fire investigation are utilised by the brigade;

Level 1 OiC of incident will determine the cause of fire where possible, or determine the need for and extent of any further investigation.

Level 2 OiC of incident supported by the Incident Support Unit. This level does not relieve the OiC of the duty to carry out the fire investigation and complete necessary reports.

Level 3 Where investigations are likely to be of a protracted nature, the OiC should request a specialist fire investigation officer.

ⁱⁱ Tyne and Wear Fire and Civil Defence Authority 1994. Annual Report 1993 / 94 Tyne and Wear Metropolitan Fire Brigade.

ⁱⁱⁱ ii. op. cit. Tyne and Wear.

Specialist officers are utilised on the flexible duty roster on Incident Support Duties (ISD) which includes Fire Investigation. These officers are responded to incidents where;

- a) Fires where there is a fatality or a likelihood of a fatality occurring.
- b) Fires of doubtful origin or where cause cannot be readily identified.
- c) Deliberate fires of a serious nature where a lengthy investigation may be necessary.
- d) Fires where the rate or type of fire development is unusual.
- e) Fires where fire safety measures have failed to operate or have proved inadequate.
- f) Fires that involve or may involve a contravention of fire safety legislation.
- g) Fires considered to be of special interest or where there are unusual circumstances.
- h) Fires where there may be political or public sensitivity.
- i) A series of deliberate fires in the same premises or adjoining premises or in close vicinity have occurred over a relatively short period of time and may be related.
- j) Confirmed fires involving five (5) or more pumping appliances.
- k) Re attendance to a previous incident within a short period.^{iv}

Officers in charge of incidents, and rostered Fire Investigation officers can be supported by an Incident Support Unit (ISU) in each division, when the operational level of fire investigation requires it.

The ISU is manned with two crew members, and its role is to provide support to officers on Fire Investigation duty, and to provide photography, both still and video, for incidents. Video equipment on the units is compatible with local TV networks.

^{iv} Tyne and Wear Operational Procedure no 71.

Fire Investigation Training

Training for members in Fire Investigation now begins at station level, with all members at stations with Incident Support Units being given a one day introduction to Fire Investigation. Further training which includes photography, video skills, and evidence preservation is in the planning phase.

The future direction for Fire Investigation in the Tyne and Wear Brigade consists of a number of initiatives that will be phased in over the next few years. These include:

1. Raising the level of Fire Investigation training and awareness of all members from recruit firefighter upwards. Specific emphasis will be directed towards the Junior Officer and Sub Officer levels, as they are usually the first on the scene of a fire.
2. Improve Fire Investigation facilities within the brigade, particularly equipment. Assistant is being sought from insurance companies to achieve this goal.
3. Have a dedicated group of fire investigation officers on the flexible duty roster, consisting of officers who are interested in carrying out fire investigations. These officers should ideally be at Divisional Officer level, and have had Fire Safety experience.
4. Improve the formulation of comprehensive fire investigation reports, in particular for specific fires that are of significant public interest. This will include targeting certain types of fires of special interest, for example, houses of multiple occupancy.
5. Utilise the comprehensive reports to identify and target problem areas. These problem areas will be identified and addressed by either the Fire Safety or Community Liaison Department.

Liaison

Tyne and Wear are putting into place a working party with the Northumbria Police to look at Fire Investigations and in particular scene preservation. It is hoped to involve the Association of British Insurers and Forensic Science Service in this working party. Liaison is already occurring with Northern Electric who provide instruction on electrical fires and faults on Fire Investigation courses.

It is also planned to discuss with the Coroner the preparation of Coroners reports and the transfer of information between involved parties.

COMMUNITY EDUCATION

Tyne and Wear Fire Brigade have an extremely pro-active community liaison group. A number of initiatives have been set up to try and decrease the number of malicious fires in the area. One scheme has been the Young Firefighters Association (YFA).

Two groups have been set up in areas using “City Challenge” monies in the West End and Tynemouth areas. The criteria for the setting up of the groups was determined by government and includes:

- Must be a socially deprived area;
- Area must have a high unemployment rate;
- Children who attend must be aged between 13-17 years;
- Must attend specific schools or live within the city challenge area.

The groups meet twice a week with the overall goal being to:

- Increase the awareness of the fire service;
- Improve the self esteem of the children;
- Improve the children’s discipline.

The schemes are relatively new, and in the areas that they cover, there has been no noticeable decrease in the number of malicious fires to date.

Future initiatives

Tyne And Wear has identified a link between Fire Investigation, its results and the provision of fire education within the community.

Proposed initiatives by the community liaison section utilising the results of a coordinated approach to Fire Investigation and its statistics include:

- A two month lag between the identification of a trend and the application of training in the community.
- Employment of a youth worker to liaise with community groups.
- Training home help and health care visitors in fire safety to reduce the number of fires and fatalities involving the elderly.
- Continued Research and Development work with the University of Sunderland to develop and apply an “Expert System” to aid fire investigations by the Fire Service.

CLEVELAND COUNTY FIRE BRIGADE

THE BRIGADE

Area

Cleveland County is located on the eastern seaboard of England, between Durham County and North Yorkshire. Central to the county is the River Tees which feeds into the North Sea. The County has many 'Special' & 'A' Class risks, including Hartlepool Nuclear Power station, Phillips refinery and tank farms, Shell oil refinery and 2 ICI chemical complexes just to name a few.

Staff

Fire protection is achieved with 9 Wholetime stations staffed by 553 Wholetime uniformed personnel, and 6 retained stations with 72 retained personnel.

The county has a population of just under 572,000.

Budget

The brigades annual budget is £19,000 Million (\$A 41,300,000).

FIRES AND FATALITIES

For the year 1993-94 the Cleveland County Fire Brigade attended 16,164 fire calls.

Of the total calls attended, 7,489 were fires (3157 primary fires, 4297 secondary fires) and 4,433 were malicious false alarms.

904 were fires in domestic households, 1,373 were vehicles.

1,403 fires were ignited with malicious intent, 129 were of doubtful origin and 38 were of unknown causes.

Of the total number of fires attended, only 0.5% were reported as being of unknown origin. Only 10 (1.1%) of the fires reported in domestic households were attributed to unknown origin.ⁱ

The trend for the year 1994-95 is increasing with calls approaching 17,500 already with 2 reporting months left at the time of my visit.

FIRE INVESTIGATION TEAMS

The majority of fires to which the brigade responds are investigated by the Officer in Charge (OiC) of the incident. When an incident demands a more thorough investigation, the brigade has a staged response order which it follows.

Stage 1

There are 3 components to a Stage 1 fire investigation;

- 1 If the cause is identified and determined as non malicious, the OiC will complete the fire report (FDR1).
- 2 If the cause is identified and considered malicious, a Stage 2 investigation is implemented.
- 3 If the cause is not identified or is doubtful, a Stage 2 investigation is implemented.

Stage 2

If a Stage 2 fire investigation is instigated, the supervisory officer for the station area concerned will attend, and the supervisory Divisional Officer will be notified. Local Criminal Investigation Division (CID) and Scenes of Crime Officers (SOCO) will also be mobilised. Stage 2 investigations are deemed to be joint investigations and occur when;

- 1 The cause is confirmed as malicious ignition. The OiC is responsible for completing all necessary fire reports, the supervisory officer will ensure the Fire Investigation report is completed and submitted, and the Police will commence criminal investigations.

ⁱ Cleveland County Fire Brigade 1994. Summary of Occurrences for the year 1993.

- 2 The cause is unidentified at Stage 1, but any further investigation is deemed unwarranted due to the nature of the incident. No further Police or Fire Brigade action will occur.
- 3 The cause is unidentified, a Stage 3 investigation is commenced.

Stage 3

A Stage 3 incident is a full fire investigation. A fire investigation team will become involved for all fires where a fatality has occurred, or where it is deemed necessary by a Stage 2 investigating officer.

The number of officers involved will be dictated by the size and nature of the incident. The senior fire brigade officer present will be responsible for liaison with the other services, for collating all relevant information, and for completing the fire investigation report. The fire investigation report must follow a standard format, which has been accepted by all other services involved in a fire investigation. The report is submitted through the Operations Commander to the County's Chief Fire Officer.

Fire Investigation Format

- 1 Investigating Officer (team).
- 2 Address of incident.
- 3 Occupiers (detail fatalities where necessary).
- 4 Time of call/ Time of arrival/ Time of stop.
- 5 Operational commitment with brief description of incident.
- 6 Description of premises with fire loading .
- 7 Damage
- 8 Location of deceased (when necessary).
- 9 Result of investigation.
- 10 Conclusions (including supposed origin).

Fire Investigation Training

Cleveland County Fire Brigade runs its own 3 day fire investigation course for Station Officers and above.

The Fire investigation course covers such topics as “The mechanisms of fire, fire language and excavation, arson targeting, debris recognition and reporting systems”.

Visiting lecturers attending the course include representatives from the Gas Board, Scenes of Crime Officers, and Forensic Pathologists.

The course also includes 2 sessions for the evaluation of case studies and the demonstration of investigative techniques.

The brigade is currently planning to expand this training to include the rank of Sub Officer.

ⁱⁱ Wood R.H. Cleveland County Fire Brigade Investigation into the causes of fire.

LONDON FIRE BRIGADE.

THE BRIGADE

The London Fire & Civil Defence Authority (LFCDA) is responsible for administration of the London Fire Brigade. The Authority also provides civil defence and emergency planning for England's capital city.

Area

The London Fire Brigade protects an area of 1600 square kilometres which incorporates the Greater London Area, and contains a population of 6.4 million people. London is also the commercial capital of England, and does not have the proliferation of heavy industry as seen in other Metropolitan areas. The population density of London however is continually growing with the increase in multi tenancy occupancy's.

Staff

The brigade has an operational strength of 6930 uniformed personnel, located in 114 fire stations throughout the Greater London Area. The management of these stations, and other associated functions have been organised into 5 operational area commands. These areas are aligned with groups of London boroughs and incorporate a broad mix of city centre, commercial, industrial, residential and semi - urban development.

Each operational area is commanded by an Assistant Chief Fire Officer who is responsible through the Deputy Chief Fire Officer to the Chief Fire Officer. The Chief Officer, as well as being in charge of England's largest fire brigade, is Director of operations of the LFCDA.

Budget

The brigades annual budget is £ 250,876,000. (\$A 545,382,600) which equates to £49.22 (\$A 107.00) per head of population. £127.8 M (\$A 277,000,000) is spent on wages for operational staff.

FIRES AND FATALITIES

In 1990/91 the brigade attended 192,087 emergency calls. 56,596 of which were fires in which 121 lives were lost, 1388 members of the public were injured, 133 firefighters were injured, and 533 members of the public were rescued.

Primary fires accounted for 19,711 calls in 1984, and 19,825 in 1993, a figure which has remained fairly constant. In 1983, fires in occupied buildings accounted for 12,948 calls and in 1993, 12,494 calls, a decrease over that period. The amount of fires in occupied buildings where the source of ignition was determined as being unknown has dropped from 692 (5.3%) to 91 (0.7%) over the same period. This decrease corresponds to the introduction of full time fire investigation units in 1984. It is also a substantial decrease from 1980 when the London Fire Brigade returned an unknown cause for 15% of fires attended.ⁱ

ⁱ LFCDA Public Relations Division 1993. People Protecting People. LFCDA Review and Statement of Accounts 1990 - 92. Swindon Press.

FIRE INVESTIGATION TEAMS

One fire investigation unit is located within each operational command of the brigade, and is crewed with a staff of 2, usually a Station Officer and Sub Officer. Minimum manning requirements allow the units to be operated with a crew of one if required.

The fire investigation units come under the command of the Assistant Chief Fire Officer, Information and Fire Safety.

The aim of the fire investigation units is to;

1. Establish the most likely causes of fires and identify trends of defects, acts or omissions giving rise to ignition.
2. Determine the reasons for the development and spread of both fire and smoke.
3. Assess the performance of building and furnishing materials in real fire situations.
4. Validate the effectiveness of fire safety in real fire situations.
5. Evolve a real fire library.

Fire investigation officers are also responsible for;

1. The brigades involvement and liaison with the Coroner.
2. The collection of data at specified fires to produce realistic information on the performance of both passive and active fire safety features.
3. To notify the Incident Commander of any infringements of fire safety legislation.
4. To identify and notify the appropriate authorities of trends which may be of special interest.

The units are ordered on to incidents;

1. Where 4 or more pumps are mobilised, or
2. To other incidents when so requested by the Incident Commander.

The Incident Commander is to request the attendance of the fire investigation unit to the following incidents if required;

1. Fires in buildings of doubtful / suspicious origin.
2. Fires where the cause would be reported as unknown.
3. Fires involving fatalities.
4. Fires where a person/s have been seriously injured.
5. Fires in buildings or categories of buildings where fires occur at a high level of frequency.
6. Fires of special interest.
7. Incidents where a flammable gas detector is required.ⁱⁱ

The incident commander is also required to inform the fire investigation unit on return to station of fires in the following categories to assist in the brigades real fire research project;

1. Fires where an automatic fire detection device has either actuated or failed to activate in a fire (excluding domestic).
2. Fires which originated in the lounge / sitting room of a dwelling.
3. Fires which have been caused by a fault in an electrical or gas appliance.

These investigations are only conducted if the owner / occupier consents.

The role of the fire investigation officers is to assist the Incident Commander to determine the following points relating to the cause of the fire;

1. Source of ignition.
2. Material or item ignited first.
3. Defect, act or omission giving rise to ignition.
4. Material or item mainly responsible for development of fire.ⁱⁱⁱ

This information is required by the Incident Commander to fully complete the fire reports required (FDR1).

ⁱⁱ London Fire Brigade Operational Note 102 (Rev 4)

ⁱⁱⁱ ii ibid (Rev 4)

The Fire Investigation teams attend on average 3,000 incidents per year. With the Fire Service in the UK having no legislative requirement to investigate fires, the units are constantly under review, and currently cost in the vicinity of £5M (\$A10,800,000) per annum to maintain and crew.

The Metropolitan Police also maintain a Fire Investigation unit, whose responsibility it is to investigate all fatal, serious injury, or suspicious/ doubtful/ deliberate fires in conjunction with the Incident Commander and brigades fire investigation unit. Liaison between the two services is good, with regular coordination meetings being held, and an information and liaison reporting system in place.

Fire Investigation Training

The London Fire Brigade has taken a positive approach to Fire Investigation training over the years, with fire investigation officers having input into recruit training, the brigades 5 day fire investigation course, and as visiting lecturers on courses run by other brigades in the country. Ongoing training involves fire investigation officers undertaking lectures for station and fire safety personnel.

Officers are also sent to the fire investigation course at The Fire Service College.

The brigade is currently developing a modular program for fire investigation training. The course consists of 6 modules which are;

1. Fire Investigation Introduction. 3 days.
2. Fire Investigation Workshop. 2 days.
3. Basic Fire Safety for Fire Investigations. 3 days.
4. Legal matters, scenarios & role plays. 2 days.
5. Submission of 4 Fire Investigation reports 4 week secondment to Fire Investigation Unit.
6. The gathering and recording of information and its presentation. 2 days.

A large percentage of the modules involve workplace experience, and have been developed to utilise the experience of current fire investigators, who act as the course coordinator and assessor.

The course will combine the necessary “on the job” experience with the underpinning knowledge that the London Fire Brigade determines as being required for their Fire Investigators.

Real Fire Research.

The London Fire Brigade has acknowledged that the future for fire investigation is “Total Fire Investigation.”

The brigades real fire research project was implemented in 1994, utilising the current fire investigation teams to gather relevant data. The ultimate aim of the project being to obtain enough information from fires so that the applicable British Standards could be modified to reflect what happens in real fire situations, rather than on data gathered from test situations.

Currently, the data base that is being compiled attempts to identify trends from fires started in or by electrical appliances. When a trend is identified, the manufacturers and Department of Trade & Industry are notified, and faults rectified. This process has resulted in remedial action being taken by the manufacturers of some electrical appliances.

The research is currently confined to the London area.

Future plans also include the community education department being given access to the data base, so they can accurately plan and target training needs within the community.

COMMUNITY EDUCATION

In London, a package entitled “Learn not to burn” has been introduced into the schools system as part of the National Curriculum. This three volume set targets children between the ages of 5 and 14 in three phases. Those phases are 5 to 8 year olds, 9 to 11 year olds and 11 to 14 year old children.

Each year, the London Fire Brigade gives fire safety talks to over 70,000 pupils between the ages of 9 and 11 as part of the Authority’s Schools Lecture programme.

HONG KONG FIRE SERVICES

THE BRIGADE

Area

The Hong Kong Fire Service is responsible for firefighting, rescue and ambulance services for the areas of Hong Kong Island, Kowloon, New Territories and Hong Kong International Airport.

The territories are divided into 3 operational commands which are, Hong Kong, Kowloon and New Territories. Each command is headed by a Chief Fire Officer, who is assisted by a Deputy Chief Fire Officer. Each command is divided into 5 divisions, 4 of which are operational divisions and one is a Fire Protection Bureau regional office.

Staff

These services are achieved with 65 fire stations, 4 fire boat stations and 29 ambulance depots located strategically throughout the territory, and staffed with 7293 uniformed personnel.

Budget

The Fire Service has a total budget of HK \$1,424.88 Million per annum (\$A260 Million). HK \$1,290.84 Million (90.5%) of this budget is spent on salaries and allowances. Funding is totally Government provided, and accounts for 1.39% of the total budget of the Hong Kong Government.

FIRES AND FATALITIES.

In 1994, the fire service responded to a total of 28,813 fire calls and 18,491 special service calls. Fires accounted for 12,396 calls, of which 4704 (37.9%) were reported as being started by the careless disposal of cigarettes, 930 (7.5%) were reported as suspicious and 593 (4.7%) were determined as being of unknown origin.

Other statistics from 1992 show that 541 persons were injured in fires, 43 civilians were killed and 1 firefighter lost his life whilst on duty.

The greatest risk for firefighters in Hong Kong is the proliferation of high rises and the number of fires in those buildings. In 1992, 244 fires were in buildings above the 25th floor, 626 fires were in the 16th to 25th floors, & 1669 fires were in the 6th to 15th floors.^{i ii}

The life risk in Hong Kong is exemplified by the number of rescues carried out by fire service personnel. At Tsim Sha Tsui Fire Station, in the Kowloon command, firefighters rescued 194 persons from 91, 1st to 3rd alarm fires from 1992 to April 1995.ⁱⁱⁱ

ⁱ Hong Kong Government Information Services Publication 1994. Hong Kong The Facts: Fire Services, September 1994. Government Printer Hong Kong.

ⁱⁱ Government Information Services 1993. Hong Kong Fire Services Review 1991 & 1992.

ⁱⁱⁱ Tsim Sha Tsui Fire Station, Fire Reports.

FIRE INVESTIGATION TEAMS

In Hong Kong, the authority to investigate fires is the prerogative of the Commissioner of Police. The Fire Services investigations into the cause of fires are aimed to prevent similar occurrences, situations or circumstances from arising again and / or to mitigate the effects of fires.

The investigation of fires falls under the jurisdiction of the Police in Hong Kong, its authority being found in Chapter 12 of the Fire Investigation Ordinance.

The chapter empowers the Commissioner of Police, *“In the case of fire, or if there is reason to suppose that an attempt has been or is about to be made to set fire to any premises or part thereof, to take possession of such premises, to the exclusion of the owners and all others”*.^{iv}

The purpose of this is to allow the police to furnish a written report detailing; *“the state of the said premises, and of its contents, and to detail all such information regarding the origin and circumstances of the fire as he may be able to obtain.”*^v

The Police will attend every fire in Hong Kong and will liaise with the OiC of the fire scene to determine whether the fire was suspicious or not.

However, the fire service receives no official feed back regarding the cause or origin of fires, and for reporting purposes, the cause of fire is determined by the fire officer making the report, who may have had little or no input into the investigation.

To highlight this, a review of all 2nd and 3rd alarm fire reports from 1992 to April 1995 at Tsim Sha Tsui fire station revealed three main (over 90%) “believed causes” of fire:

^{iv} Hong Kong Fire Investigation Ordinance Chapter 12

- 1) Suspicious Circumstances;
- 2) Disposal of lighted smoking material;
- 3) Sparks/heat generated from electrical short circuit ignited the insulating material of electric wiring.^{vi}

Sections 17 and 18 of the Hong Kong Fire Services Incident Report request details of any dangerous goods involved, and if the Fire Protection Bureau has been informed, particularly with regards to suspected overstorage of dangerous goods.

This gives the fire service the power to investigate the storage and handling of dangerous goods, with a view to preventing a re-occurrence of accidents. The police, however, retain the right to exclude the fire service from any premises, until their investigations are finalised, and if the dangerous goods are considered to be of an evidential nature, the goods will be retained by the Police, rather than impounded by the Fire Protection Bureau.

^v iv *ibid* Chapter 12

^{vi} iii *ibid*. Tsim Sha Tsui Fire Station.

Fire Investigation Training

Fire Investigation training within the Hong Kong Fire Service was until recently (1987) gained through various American institutions, however the service now runs its own 1 week course for Station Officers and above. The course covers such topics as legislation, arson motives, arson detection, fire behaviour, incendiary devices, determining origin and cause, fire scene searches, recognition and preservation of evidence, explosions and electrical fires.

COMMUNITY EDUCATION

A fire prevention teaching kit has been jointly produced by the Education Department and the Fire Services Department. The kit comprises teaching materials and a video tape and is aimed at primary schools children. The purpose of the kit is to;

- Help children understand fire.
- Help children understand the use and abuses of fire.
- Help children understand the importance of fire prevention and paying attention to preventative measures.
- Help children understand the fire services provided in Hong Kong and the importance of the work of the Fire Services Department.

UNITED KINGDOM “FLEXIBLE DUTY SYSTEM”

NATIONAL JOINT COUNCIL FOR LOCAL AUTHORITIES’ FIRE BRIGADES

SCHEMES OF CONDITIONS OF SERVICE

4TH EDITION 1981

SECTION II - DUTY SYSTEMS AND HOURS OF DUTY

3. Station Officers and Higher Ranks

i) Flexible Duty System

An officer employed on the flexible duty system shall be conditioned to 2 types of duty, managerial and standby/call out defined as follows:

- 1) Managerial Duty is duty rostered to perform the operational command, managerial, supervisory and/or specialist duties appropriate to the officers post; such duty shall be known as “positive hours”.
- 2) Standby/call out duty is duty rostered to ensure that the officer is available on call for the urgent performance of duties specified under (1) above, including the performance of such duties if the officer is called upon.

ii) Rostering arrangements for the flexible duty system shall be such as to conform with all of the following principles:

- 1) The sum of the rostered managerial duty hours and the rostered standby/callout duty hours, the latter divided by 4, shall be 48 hours a week, on average on a cycle not exceeding 8 weeks.
- 2) No rota shall contain more than 5 consecutive periods of 24 hours during which a duty of either type is performed.
- 3) In any 2 week period commencing on a Monday there shall be at least 2 pairs of rota leave days.
- 4) Any period of standby/call out duty shall be all or part of a period of 24 hours duty, (starting at the normal starting time) and shall be rostered immediately before or immediately after a period of positive hours, unless it is an entire period of 24 hours standby/call out duty.

- 5) On any day on which managerial duty is performed the hours for that duty shall be rostered consecutively except where an evening duty is required in addition to a normal day duty (for these purposes, in view of long standing custom and practice in the fire service, one meal break in each period of 24 hours will be treated as a period of managerial duty).
 - 6) Travelling time to and from a rostered evening commitment of managerial duty shall itself count as managerial duty.
 - 7) Rota leave shall be rostered no less frequently on a Saturday or Sunday than any other day of the week.
 - 8) The total sum of managerial hours shall not average more than 42 a week.
 - 9) The sum of the weekly hours of both types of duty shall not exceed 78 on average.
- iii)** Locally unresolved difficulties over rostering arrangements shall be referred to the Joint Advisory Panel of the Officers Committee for their assistance. In such instances, changes shall not be implemented locally before the Joint Advisory Panel has considered the matter or, if it is not resolved thereby the Officers Committee has considered the matter.
- iv)** An officer conditioned to the flexible duty system may:
- 1) In exceptional circumstances be allowed periods of “short leave” during which he/she may be completely detached from duty, out of touch and beyond recall, subject to the arrangements from him/her to be notified of incidents occurring within his/her jurisdiction.
- v)** An officer conditioned to the flexible duty system shall be notified of the geographical area within which he/she will be required to be based for the performance of his/her standby call out duty.ⁱ

ⁱ National Joint Council for Local Authorities Fire Brigades 1981 4th Edition. Schemes and Conditions of Service. Section 2, Duty Systems and Hours of Duty.

