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Criminology Research Council

and

NSW Standing Committee on Arson

STUDY OF
THE PATTERN OF COSTS OF ARSON IN NSW

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ECONOMIC RESEARCH
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THE PATTERN OF COSTS OF ARSON IN NSW

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by

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FOREWORD AND ACKNOWLEDGEMENTS

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The research grant was approved by the Council on 13 December 1985 for the NSW Standing Committee on Arson.

The research was carried out by Nicholas Clark and Associates, Economic and Social Research Consultants, on behalf of the NSW Standing Committee on Arson. The research team of Nicholas Clark and Associates comprised:

Ms Kiersten Schou,	Senior Economist and Manager Sydney Office, Nicholas Clark and Associates
Dr Chris Hall,	Assistant Head of School of Business Studies, Kuring-gai College of Advanced Education
Ms Alyson Moore,	Social Psychologist, Nicholas Clark and Associates

A Steering Committee comprising representatives of key organisations concerned was established to guide the research. The members were:

Criminology Research Council
Mr David Biles
Deputy Director Australian Institutes of Criminology

NSW Standing Committee on Arson
Mr Max Pallavicini,
Chairman, NSW Standing Committee on Arson
Mr Allan Porter
Insurance Council of Australia
Mr Bill Newall
Detective Inspector, Major Crimes Squad, NSW Police Force
Mr Keith Eadie
District Officer, NSW Fire Brigades

The full Steering Committee, including the Research Team, meet on four occasions during the project.

The study received valuable cooperation and assistance from members of the Steering Committee and their organisations. In particular, we would like to thank the NSW Fire Brigades and the NSW Police Force for their efforts in compiling statistical data for the study.

With this assistance and valuable data inputs this study has been able to make a substantial contribution to the knowledge and understanding of the pattern of costs of arson in NSW.

SUMMARY

Arson is the intentional or malicious act of destroying or damaging life or property by means of fire. To secure a conviction for arson requires proof beyond reasonable doubt. Because arson inherently tends to destroy evidence it is often extremely difficult to prosecute successfully. Nevertheless, a significant proportion of fires may be suspected as being due to arson, and these impose a range of costs on the community, such as infrastructural, insurance and replacement costs.

In order to reduce the burden of costs of arson it is necessary to know where that burden falls, and where it falls most heavily. Information on the pattern of costs of arson can assist in directing resources to the areas where they are most likely to be effective in reducing the overall burden of the costs of arson.

This study principally sought to identify and describe the significant features of the pattern of costs of arson in NSW. The main emphasis of the study was in using available information to build up a mosaic which gives some idea of the main features of the pattern. This has only been possible because of recent efforts by the NSW Police and Fire Brigades to develop computer data base structures which include information relevant to arson. Prior to 1981 there is only sketchy information available and for the period between 1981 and 1983 there is no information at all available in a readily retrievable form. Because there are still a number of problems to be addressed in the collection and compilation of information related to arson, some caution needs to be taken in interpretation of data.

The main findings of the study were:

a. Each year there are about 25,000 fire incidents attended by the Fire Brigade in NSW, and these appear to cause about $150 million in replacement damage costs.

b. There are very few successful prosecutions for the crime of arson as such. Only about 10 persons are convicted of arson each year in NSW, although other charges (such as malicious damage, manslaughter) are sometimes used instead of a charge of arson.

c. Police and Fire Brigade sources indicate however that there are some 1,500 to 3,000 incidents each year which are almost certainly arson, and these cause about $25 million in replacement damage costs.

d. Suspicious and other fires which are likely to have some contributing element of arson probably cause about another $40 million in replacement damage costs.

e. Most of the costs associated with arson occur in shops, offices, cars and dwellings; these categories account for over 70% of costs, indicating that most arson is carried out for pecuniary reasons.

f. Persons under 16 years of age contribute to 28% of fire incidents, but to only a small proportion (7%) of fire damage, and only some of this is intentional and malicious.

g. Arson tends to be concentrated in the metropolitan area. About 60% of fire incidents occur in the Sydney metropolitan region, relative to about 75% of arson incidents and about 80% of damage due to arson being in the metropolitan area.

h. The top 10% of fires usually constitute around 90% of the costs associated with fires, whether they are suspicious or not.

i. There are relatively few deaths and injuries attributable to arson.

j. There appears to be an increasing trend in arson incidents; the number of arson incidents appears to have doubled every eight years since 1964.

k. Arson constitutes a substantial and increasing problem. There is significant potential for improvement in the way the arson problem is managed in NSW. Areas which, in particular, warrant further research and feasibility assessment are:

- improvements in the method of data collection and computation
- more detailed assessment of the pattern of costs associated with arson, particularly in high cost and hidden cost areas
- the development of coordinated management strategies for combating arson

CONTENTS

1. INTRODUCTION

1.1 What is Arson?

For the purposes of this report, arson is the intentional or malicious act of destroying or damaging property or life by means of fire.

1.2 Causes of Arson

Arson is generally precipitated by any or all of the following categories of causal factors:

1. pyromania and vandalism; the psychological satisfaction derived from fire and related events.

2. concealment; fire is an effective way of destroying evidence of some other crime.

3. fraudulent liquidation; arson allows the liquidation of assets by means of fraudulent insurance claims.

4. subversive destruction; arson may serve to destroy property which is subject to legally binding restrictions (such as heritage orders or covenants).

5. terrorism; incendiary and explosive devices used for terrorist purposes.

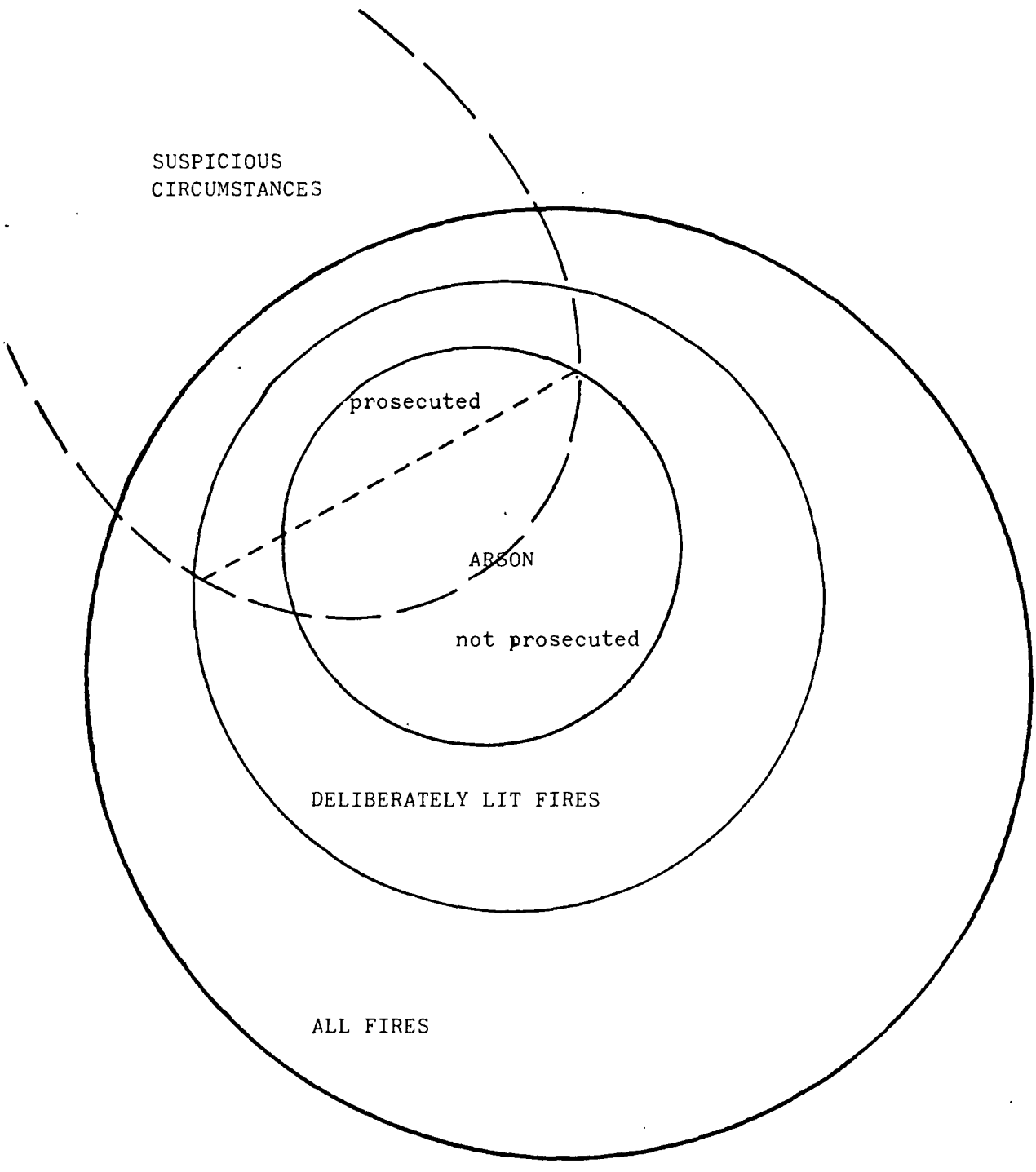
6. contributory negligence; negligence at the point of ignition (e.g. with a cigarette or welders spark) may lead to extensive but avoidable damage. Contributory negligence has not been included in the analysis of this report.

1.3 The Criminological Perspective on Arson

In NSW arson is a crime under the Crimes Act (Act 40, 1900). To establish the existence of arson at a level sufficient to successfully prosecute requires that a case be made beyond reasonable doubt. Arson inherently tends to destroy evidence, thus making it more difficult to successfully prosecute, particularly where the cost of collecting evidence is high relative to the actual damage caused.

Figure 1:i illustrates the relation between fire, arson and prosecution. All instances of arson involve deliberate lighting of fire. Some fires will appear suspicious, no matter whether they are actual arson, deliberately lit without any malicious intent, or just simply accidents. Only a proportion of actual arsons will incur suspicion, and only some of these will be prosecuted. An even smaller subset will be successfully prosecuted.

Figure 1:i



1.4 Examples of Arson

Five cases of arson provide a useful illustration of how and why arson occurs. The cases are hypothetical stereotypes, but are based on an amalgam of real cases.

Case 1. A car is completely gutted by fire after being dumped at the roadside. Reported stolen by its owner shortly before, the car is stripped of most of its accessories, such as stereo, burglar alarm etc. The insured value of the car and accessories is, say, $10,000. Under normal circumstances, it is virtually impossible to set fire to a car and it has almost certainly been deliberately set alight, but it is difficult to find evidence sufficient to lay charges of arson.

Case 2. A combined shop and dwelling in an inner city suburb is extensively damaged by fire, as is the stock which has recently been substantially revalued and insured accordingly. The total insurance claim for repair and replacement is, say, $150,000, $50,000 of which is for stock. The owner is known to be badly in debt and the accounts, now lost in the fire, would clearly indicate a hopeless trading situation. The fire commenced in rubbish stored at the rear of the building and spread rapidly. The owner acknowledges that the fire was probably deliberately lit, but complains of problems with children under 16 who regularly light fires in the area.

Case 3. A church with considerable heritage value, but located on a prime development site, is extensively damaged by fire. Total replacement cost is estimated at $500,000, but much of what is damaged is not replaceable. Although arson is suspected, the insurer pays out the full sum, which, after consideration by the church elders, is diverted to more worthy causes than the replacement of building in an area of declining congregations. The site and remaining structure is auctioned.

Case 4. A deranged patient at a nursing home deliberately sets fire to bedding. The fire spreads and partially as a result of breaches in building codes and poor safety training of staff several patients are killed and a number of others badly burnt. Damage is extensive and emergency services from at least five centres are used to capacity for several hours.

Case 5. An incendiary device in the luggage hold of an international aircraft explodes just as the plane is about to be pulled away from the terminal. The aircraft is fully loaded with fuel and passengers, and the ensuing fire causes considerable loss of life, destroys the aircraft totally and extensively damages adjacent aircraft as well as the terminal building.

1.5 The costs and losses associated with arson.

Although there are a number of different concepts of cost, the most fundamental is that of opportunity cost. The opportunity cost of something is represented by the sacrifice necessary to obtain it. For commodities which are readily marketable, this cost is fairly closely approximated by their price; if something, say a table, has a price of $1,000 then in order to obtain it, it is necessary to forgo $1,000 which may have been used to purchase other things.

Arson destroys or damages things which have already been created or produced. The opportunity cost has thus already been incurred, whether it be the production of a table, or the time, effort, and resources necessary to train a skilled person such as a pianist. When arson destroys the table, or injures the pianist there is a loss to the community and/or to the "owner" of the thing destroyed. This loss corresponds to the reduction in value due to the destruction or damage. This loss is quite real and may be quite significant, but it is strictly not a cost, because it involves no opportunity cost. To replace what is lost, if that is possible, involves sacrifice and hence a cost. In many cases however, what is lost is in some way unique, and cannot be replaced. For this reason the concepts of value and cost become confused in assessing the economic impact, dimension and pattern of arson.

Value is essentially a subjective notion, and the value which is placed on something or someone is very much in the eye of the beholder. For example, a set of wedding photographs may be valued as a priceless record by the main protagonists, but as virtually valueless to anyone else (or even to the protagonists upon their divorce).

It is logically impossible to establish a single, consistent value for the damage and destruction from arson, and it is equally impossible to establish what the real value of that loss

is to any affected individual or body corporate. This is due to the fact that, first, different people will attach different values to the same loss and there is no way of establishing one person's value as more correct than any other, and that, second, there is often no way of verifying whether a person is telling the truth or not with respect to the monetary value that they attach to something.

However, it is possible to establish a methodology which gauges the costs associated with arson in a reasonably consistent and objective way. This study concentrates on the costs associated with arson and makes no attempt to gauge the loss in value which arises from arson.

1.6 The Basic Pattern of Costs Associated with Arson.

Whilst the loss in value arising from arson is usually obviously and immediately related to the criminal act and ensuing fire, the costs associated with arson are dispersed and less obviously related. Table 1:i , on the following page, serves to represent schematically the pattern which links the costs associated with arson to an event and the economic group most likely to bear those costs. Such a pattern also has geographical, temporal, and social dimensions to it.

TABLE 1: Diagramatic Representation of the Pattern of Costs Associated with Arson

ARSON PRECIPITATED BY
- pyromania
- concealment
- fraudulent liquidation
- subversive destruction
- contributory negligence
- terrorism

EVENT	Infrastructure . Police . Fire Brigade etc (establishment & maintenance)	Property/Resource: created or purchased	Property/Resource insured	Fire/Arson property destroyed or damaged	Investigation extinguishing prosecution clean up demolition etc.	Insurance claim and payout	disruption	Replacement of damaged or destroyed property or resource
DIRECT GAINERS	Services concerned		Insurance Company	? possible psychological benefit		Policy holder (possibly arsonist)		
LOSERS	General revenue		Resource or property owner, payee of premium	Property owner		Insurance Company		
COSTS	Budget	Historical cost	Premium	nil	Direct costs of service concerned	Payout		Replacement cost
COSTS ASSOCIATED WITH ARSON.....	Additional outlay due to arson related activities	design costs on property to reduce fire damage	Additional part of premium due to arson	nil	Direct costs of service concerned	Payout for otherwise unnecessary claim	inconvenience loss of income etc.	Replacement cost
WHICH ARE DIRECTLY BORNE BY	Service department concerned, ultimately by taxpayer	owner ultimately in part by consumers	Payee of premium Insurance Co.		Service department	Insurance Company	community	Property/Resource owner Other individuals Community Government

The major cost categories are:

Infrastructure Costs

Emergency and preventive services (such as the Fire Brigade, police, ambulance and state emergency services) must have an established infrastructure in place to deal with emergencies and events as they arise. Thus capital and recurrent costs associated with such infrastructure are incurred in anticipation of events. If there is an increase in the number of events (as in the case of stolen cars) attributable to arson, or if the probability increases of a single event (as with terrorist acts at airports, or the arson of a hospital) which can potentially cause much damage, then greater outlays may be made.

Construction, purchase cost

The historical cost of creating or purchasing a resource gives some guide as to the monetary value of the resource, which in turn gives some guidance as to the insurable value and replacement cost if the resource is subsequently destroyed by arson.

However, at the point of creation or purchase the only cost associated with arson is the additional cost associated with design characteristics; if the probability of damage by fire is increased by the existence of arson then it is likely that additional costs will be incurred to reduce that risk. For example, design requirements for airports, hospitals, other public buildings, houses and cars can be imposed in such a way as to reduce the risk and level of damage associated with fire. The use of special fire retardent and resistant materials, and additional design considerations will usually add to the cost of construction or purchase, over and above that required if the level of arson was less. Similarly the installation of intruder security alarm systems will add to costs.

Premium Costs

Insurance premiums are generally based on the insurer's assessment of the risk of occurrence of an event. Because arson is a crime there is no obligation for an insurer to meet a claim from an insured party who has deliberately set the property alight. However, the difficulty of establishing beyond a reasonable doubt

that the insured did actually commit arson makes it likely that a proportion of fraudulent claims will in fact have to be met. The insurer also has an obligation to pay the innocent insured where a third party is responsible for arson. Consequently, the insurer must raise premiums to take account of the increased risk arising from arson. Not all of this additional cost associated with arson will be borne by the consumers; depending on the competitive pressures in the market and the responsiveness of demand, some part will usually be borne by the insurers.

Investigation, extinguishing costs

Specific cases of arson give rise to costs which are identifiably related to extinguishing the fire, cleaning up and investigating. For example, the burnt out car may be removed by the local council, the fire brigade may have to demolish unsafe walls, the insurance assessor, along with police, brigade and ambulance personnel may have to carry out investigations, and there may have to be coronial inquiries and court cases. Some of these costs overlap the infrastructural costs cited above, but some are identifiable as being solely due to a specific case of arson or fire.

Insurance payout costs

The amount paid out in response to a claim is an easily identifiable cost to an insurer. The proportion of payouts associated with arson is a more difficult matter. An insurer is under no obligation to meet a claim where it is established that the claimant is an arsonist and is responsible for the damage, but it is difficult to establish proof to a level acceptable to the courts. The insurer may still have some obligation to meet claims arising from arson, albeit, the insurer may have some legal claim against the arsonist which might sometimes help offset the payout cost.

If all arsonists could be caught and successfully prosecuted, and if all arsonists had sufficient funds to meet claims on them arising from their damage, there would be no insurance payout costs associated with arson. In a less than perfect world a proportion of insurance payouts are made as a result of arson.

Disruption costs

The fire and damage arising from arson may disrupt normal social and economic life. For example,

- The closure of an airport may force diversion of flights to other centres adding to fuel costs and creating inconvenience for passengers.

- Emergency services getting to a burning car or shop may disrupt peak hour traffic and extend travel time for commuters. Similarly, the response time to other emergencies may be extended.

- A fire in a building may lead to smoke and water damage in adjacent premises.

- A business or public building being destroyed may lead to a loss of income and employment for suppliers and employees, and may force customers and clients to seek service further afield.

- An insurance company, suspecting arson but unable to establish proof beyond reasonable doubt, delays meeting a claim. The claimant faces cash flow problems as a result and must raise finance.

Replacement costs

Not all resources destroyed by arson warrant replacement, and some are impossible to replace. Where replacement is possible and does occur, a cost is incurred by the owner of the new resource or property.

1.7 Why the Pattern of Costs is important.

In order to reduce the burden of the costs of arson it is necessary to know where that burden falls and where it falls most heavily. For this reason information on the pattern of costs of arson is important. Without it, little can be done to direct resources to the areas where they are most likely to be effective in combating arson.

Whilst it is tempting to simply aggregate all the costs associated with arson to arrive at a figure for the total cost of arson, such an exercise is rather meaningless and of little assistance in dealing with the problem of arson. If arson imposes costs it also bestows benefits. The cost of an insurance payout to insurers is a benefit to the insured, increased infrastructural costs translate into more equipment, personnel and wages for emergency services. To add all these costs together is to count the same cost several times and thus to arrive at an exaggerated and misleading estimate of the total cost of arson.

1.8 The Scope and Focus of the Study.

The main objectives of this study were to

(a) identify and describe the significant features of the pattern of costs of arson in NSW;

(b) establish a methodology which permits the consistent estimation of the costs associated with arson;

(c) provide an information base appropriate to the improved management of the processes and resources used to combat arson in NSW;

(d) suggest improvements in statistical collection and storage in the area.

The main focus of the study has been to use available information to describe the significant features of the pattern of arson in NSW. The scope of the study has been limited by the availability of appropriate information from existing sources, and by the project budget.

The broad methodology framework set out in section 1.6 has been used as a basis for assessing the information available. Some suggestions for improvements to the information base, and the method of collecting and processing information are made in section 5.

1.9 Data Sources, Limitations and Approach

Fairly comprehensive information related to fires and arson is available from

- Police and
- Fire Brigades

The information gathered by these two sources is primarily geared to their own organisational needs, rather than to assisting in the analysis of the pattern of costs of arson. Thus the Police are primarily concerned with securing prosecutions, and the Fire Brigade primarily concerned with limiting the loss of life and property, and with ensuring that they have adequate equipment and resources to cope with emergencies when they arise. Estimates of costs of damage made by Police and Fire Brigade are often made by personnel who have little or no training in making such estimates, and who are, quite understandably, often more concerned with the issues at hand than arriving at an accurate estimate of cost.

Nevertheless, we have had to rely on available cost estimates as a basis for assessing the level and pattern of the costs of arson. In doing this several difficulties had to be faced.

First, Police and Fire Brigade data are collected on different forms and categorised in different ways. Thus it is difficult sometimes to reconcile the results from each source.

Second, efforts to collect comprehensive data are relatively recent. Centralisation of NSW Police records only dates from 1984, and whilst the Fire Brigade has published statistics for over 20 years, the method of collection has changed from time to time and no statistical compilation at all has been made for the period 1981-1983.

Third, within the time frame set for the completion of this study it has not been possible to obtain an overlapping period of data from Police and Fire Brigades. Thus it has been difficult to corroborate and reconcile data and results from different sources.

The approach adopted has thus been one of building up a mosaic, or jigsaw, using various fragments of information to try to

establish a picture of the overall pattern. Necessarily such an approach is less precise than might be wished, but we believe the results to be quite robust.

1.9.1 NSW Police Force: Information on Arson

Arson is one of the most serious offences under the Crimes Act, providing for imprisonment of a maximum of 3 years to life for convicted offenders. Thus fires where there are suspicious circumstances become matters of police interest. The Police do not attend all fires, and thus the information collected by Police tends to be biased toward the more serious incidents.

In February 1985, the Police introduced a new fire reporting form, the P60, a copy of which is shown as Figure 1:ii.

The P60 form is now completed for all fires by the uniformed officer in attendance. The data recorded on the P60 form are then entered onto a computer by the Crime Intelligence Information Service, which is part of the Modus Operandi Section of the NSW Police Force.

Prior to the introduction of the P60 form and fire reporting procedure last year, Police records on suspicious fires were very sketchy. Records were not centrally kept and incidences of fires were recorded only on individual police station occurrence sheets. This makes it very difficult indeed to undertake any detailed analysis of arson from police data prior to 1985.

For the period prior to February 1985, the only data readily available are summary statistics on

- the total number of fires by district
- the total number of established arson offences by district
- arson offences by type of premises

Since February 1985 all police records relating to fires and to arson are centralised on a data base. The information fields on this data base which are of relevance to this study are as follows:

1. District

2. Fire Incident Type
   - arson (deliberately lit)
   - suspicious
   - not suspicious
   - cause not known

3. Premises
   - e.g car
   - building/domestic

4. Insurance

5. Condition of victim

6. Value damaged

Police data made available for this study covered the period April 1985 to March 1986

Figure 1:ii P60 Form

FIRE REPORT

N.S.W. POLICE DEPARTMENT P.60

1. MICROFILM REFERENCE No.

2. SUBMITTING STATION | 3. PATROL WHERE OCCURRED | 4. ALLOCATING STATION | 5. STATION INDEX No.

IF THIS IS AN ORIGINAL REPORT – GO TO BOX 10
IF THIS IS FURTHER INFORMATION – CONTINUE AT BOX 6 →

6. ORIGINAL ALLOCATING STATION | 7. ORIGINAL INDEX No.

8. OCCUPIER/OWNER – NAME AS ORIGINALLY REPORTED

9. NAME-INDICATE WHETHER ADDITIONAL OR ALTERED-THEN ENTER ALTERED NAME IN RELEVANT BOX – ALTERED ☐ ADDITIONAL ☐

10. LOCATION OF FIRE – ADDRESS

11. WHEN OCCURRED TIME/DAY/DATE

12. OCCUPIER/DRIVER/CUSTODIAN

13. IF COMPANY – DIRECTORS NAMES AND ADDRESSES

14. OCCUPATION, SEX, AGE/DOB

15. RES. ADDRESS PHONE

16. BUS. ADDRESS PHONE

17. OWNER

18. IF COMPANY – DIRECTORS NAMES AND ADDRESSES

19. OCCUPATION, SEX, AGE/DOB

20. RES. ADDRESS PHONE

21. BUS. ADDRESS PHONE

22. FIRE – IGNITION METHOD

23. WHERE FIRE ORIGINATED

24. PREMISES ALARMED YES ☐ NO ☐

25. FORCED ENTRY – BY FIRE BRIGADE ☐ OTHER ☐ SPECIFY–

26. TYPE OF PROPERTY: DWELLING HOUSE ☐ FACTORY ☐ SHOP ☐ WAREHOUSE ☐ SCHOOL ☐ VEHICLE ☐ GRASS/SCRUB ☐ FOREST ☐ RURAL ☐ OTHER ☐ SPECIFY–

27. PREMISES OCCUPIED ☐ PREMISES UNOCCUPIED ☐

28. CLASS OF BUSINESS

29. CONTENTS OF BUILDING

30. TIME AND DATE REPORTED

31. BY WHOM REPORTED

32. LAST PERSON ON PREMISES

33. OCCUPATION, SEX, AGE/DOB.

34. RES. ADDRESS PHONE

35. BUS. ADDRESS PHONE

36. WITNESSES

37. OCCUPATION, SEX, AGE/DOB.

38. RES. ADDRESS PHONE

39. BUS. ADDRESS PHONE

40. INSURANCE COY – PROPERTY/PREMISES

41. NAME OF INSURED | 42. POLICY No.

43. DATE POLICY EFFECTED | 44. DATE POLICY ALTERED | 45. NATURE OF ALTERATION | 46. AMOUNT INSURED

47. INSURANCE COY – CONTENTS

48. NAME OF INSURED | 49. POLICY No.

50. DATE POLICY EFFECTED | 51. DATE POLICY ALTERED | 52. NATURE OF ALTERATION | 53. AMOUNT INSURED

54. SUSPECTS

55. ADDRESS PHONE

56. REASON FOR SUSPICION

57. CLOTHING WORN

58. AGE | 59. D.O.B. | 60. SEX | 61. HEIGHT | 62. BUILD | 63. HAIR | 64. COMP. | 65. EYES

66. RACIAL APPEARANCE:– WHITE ☐ ABORIGINE ☐ ARAB ☐ ASIAN ☐ INDIAN ☐ MAORI ☐ MEDITERRANEAN ☐ NEGRO ☐ PACIFIC ISLANDER ☐ SLAVIC ☐ OTHER ☐ SPECIFY–

67. VEHICLE STATE REG'D | REG'D No. | YEAR | MAKE/MODEL | TYPE | COLOURS | STOLEN ☐ NOT STOLEN ☐

68. NARRATIVE (INCLUDE ALL CIRCUMSTANCES OF ORIGIN, EXTENT OF FIRE DAMAGE, ANY SUSPICIOUS CIRCUMSTANCES. WHEREABOUTS OF OWNER/OCCUPIER AT TIME OF FIRE, ALSO INCLUDE DETAILS OF ANY OTHER INTERESTS IN THE PROPERTY.)

(IF INSUFFICIENT SPACE USE A CONTINUATION SHEET)

69. CORONIAL INQUIRY REQUESTED BY:– OWNER ☐ INS. Co. ☐ POLICE ☐ FIRE AUTHORITY ☐ OTHER ☐ SPECIFY–

70. WAS THE FIRE:– DELIBERATELY LIT ☐ SUSPICIOUS ☐ NOT SUSPICIOUS ☐ CAUSE NOT KNOWN ☐

71. DAMAGE $

72. FIRST ON SCENE POLICE IN CHARGE | SCIENTIFIC DETECTIVES

73. SIGNATURE | 74. NAME | 75. RANK | 76. CHECKED BY | 77. STATION | 78. DATE

1.9.2 NSW Fire Brigade: Information on Fire and Arson

Fire Brigade information on fires was collated by the Board of Fire Commissioners, and reported in an annual Fire Statistics report prior to 1973. In 1974 a number of major changes were made to the collection and reporting system and again in 1975 a new system was introduced and implemented by the Australian Bureau of Statistics. This new series was continued until 1980. Records for the period prior to and including 1980 are manual, and cannot be accessed for analytical purposes in any way other than as they are published.

No compilation or publication of fire statistics was attempted by the Fire Brigade between 1981 and 1983.

In April 1984 a new reporting system based on Australian Standard AS 2577-1983 was adopted by the Board of Fire Commissioners.

Information is collected on a form: Australian National Fire Data and Incident Report.

The incident report is generally completed by Fire Brigade personnel after attending a fire. The Incident report form is shown in Figure 1:iii

The Statistics and Research section at the Board of Fire Commisioners compiles and processes data from the ANFD forms. At the time of undertaking the analysis for this study, data entry had been completed only up to December 1984. However, we understand that 1985 data is now being processed and will be available before long.

The fields of relevance on the ANFD base are

- fixed property use
- mobile property use
- complex
- ignition factor
- damage
- local government code
- related injuries
- related fatalities

Comprehensive Australian National Fire Data available for this study covers the period April to December 1984, whilst other Fire Brigade data have been incorporated from as far back as 1964.

Figure 1:iii ANFD - Incident Report

AUSTRALIAN NATIONAL FIRE DATA—INCIDENT REPORT

FILL IN THIS REPORT IN YOUR OWN WORDS NFD 16

COMPLETE FOR ALL INCIDENTS

A	BRIGADE IDENTIFICATION		INCIDENT No	EXP	DAY MO YEAR	DAY OF WEEK
B	LOCAL GOVERNMENT AREA CODE	NATIONAL GRID REFERENCE Zone E N			ALARM TIME	TIME OF ARRIVAL / TIME IN SERVICE
C	METHOD OF ALARM			TYPE OF SITUATION FOUND		
D	TYPE OF ACTION TAKEN				MUTUAL AID RECD/GIVEN	
E	No OF FIRE SERVICE PERSONNEL	No OF PUMPERS		No OF AERIAL APPARATUS		No OF OTHER VEHICLES

COMPLETE LINE F IF ALARM RECEIVED FROM AUTOMATIC DETECTION SYSTEM

F	AREA OF CALL ORIGIN	LEVEL OF CALL ORIGIN	TYPE OF DETECTOR

COMPLETE IF CASUALTY OR FIRE

G	No OF RELATED INJURIES BRIGADE / OTHER	No OF RELATED FATALITIES BRIGADE / OTHER		COMPLEX	
H	FIXED PROPERTY USE		MOBILE PROPERTY TYPE		
I	If mobile property YEAR	MAKE	MODEL	SERIAL No	REGISTRATION No

COMPLETE FOR FIRE

ALL FIRES

J	AREA OF FIRE ORIGIN		LEVEL OF FIRE ORIGIN		No OF STOREYS IN BUILDING
K	EQUIPMENT INVOLVED IN IGNITION		FORM OF HEAT OF IGNITION		
L	If equipment involved in ignition YEAR	MAKE	MODEL	SERIAL No	VOLTAGE
M	TYPE OF MATERIAL IGNITED FIRST	FORM OF MATERIAL IGNITED FIRST		IGNITION FACTOR	
N	FORM OF OTHER MATERIALS INVOLVED				
O	MAJOR FIRE FIGHTING FORCE	MAJOR METHOD OF EXTINGUISHMENT		MAJOR EXTINGUISHING MEDIUM	
P	PROPERTY DAMAGE CLASSIFICATION	ESTIMATED QUANTITY OF WATER USED (cubic metres)		PEAK APPLICATION RATE (litres/second)	

STRUCTURE FIRE ONLY

Q	STRUCTURE TYPE	CONSTRUCTION TYPE	WALL LININGS	CEILING LININGS
R	EXTENT OF FLAME DAMAGE	EXTENT OF SMOKE DAMAGE	EXTENT OF WATER DAMAGE	
S	DETECTOR PERFORMANCE	SPRINKLER PERFORMANCE	No OF HEADS OPERATED	
T	If flame spread beyond room of origin — TYPE OF MATERIAL GENERATING MOST FLAME		AVENUE OF TRAVEL	
U	If smoke spread beyond room of origin — TYPE OF MATERIAL GENERATING MOST SMOKE		AVENUE OF TRAVEL	

COMPLETE FOR ALL INCIDENTS

BRIEF DESCRIPTION OF INCIDENT
(progress unusual events, etc)

CONFIDENTIAL AND LOCAL BRIGADE INFORMATION MAY BE RECORDED ON THE OTHER SIDE OF THIS FORM OR ON OPPOSITE PAGE

NEW SOUTH WALES FIRE BRIGADES

REPORT OF FIRE OR OTHER INCIDENT

Day/Month/Day _____ PLATOON: _____ Time of Call: _____

Location of Fire or Other Incident: _____

Incident Description: _____ INSURANCE COMPANY Contents Crop, etc. _____

Occupant's Name: _____ INSURANCE COMPANY Structure Transportation etc. _____

Owner's Name: _____

Address _____

Fire District inside ☐ outside ☐

PARTICULARS OF ATTENDANCE			TIME ORDERED ON	TIME OF ARRIVAL (Sig. 8.)	Km TO INCIDENT
STATION(S)	APPLIANCE(S)	STAFF			

REASON FOR DELAYED RESPONSE: TRAFFIC ☐ WEATHER ☐ OTHER ☐ _____

WEATHER CONDITIONS (PREVAILING TIME OF CALL) _____

STRUCTURE FIRE volume of fire damage in m³ ☐☐☐☐☐☐

No. OF JETS f.a.p. ☐ 38mm ☐ 70mm ☐ 95mm ☐

OTHER SERVICES ATTENDING Police ☐ Amb. ☐ SES ☐ Elect. ☐

Gas ☐ Water ☐ Other ☐ _____

REPORTING OFFICER _____ Signed _____

(FULL NAME, PRINT) REPORTING OFFICER

2. THE PATTERN OF DAMAGE FROM FIRE

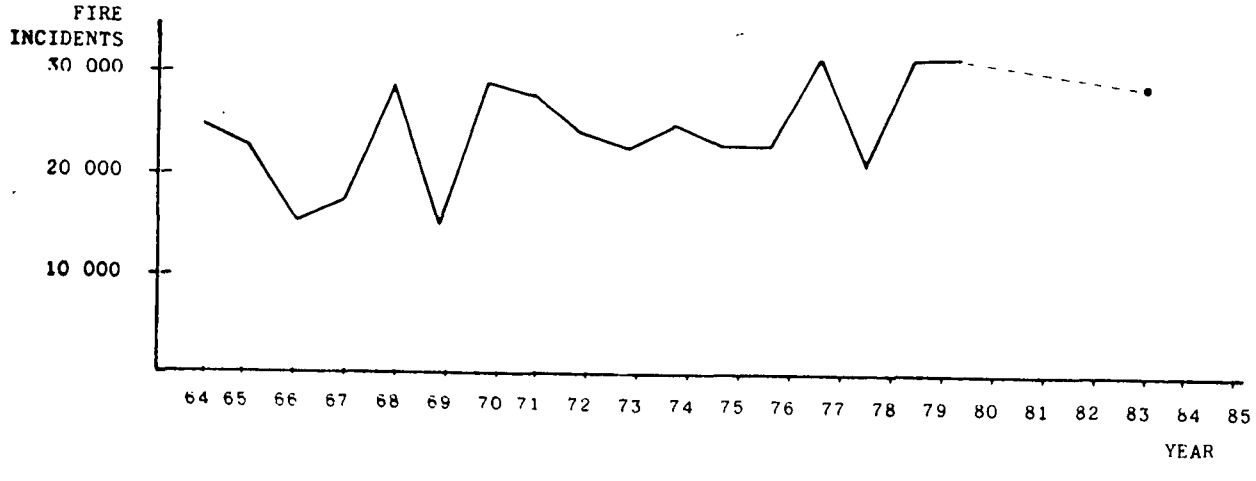
2.1 The Pattern of Fire Incidents

Considerable caution must be exercised in interpreting and comparing available data on fires and damage from fire in New South Wales. Thus the following results should be regarded as indicative rather than as a precise and factual description. Data sources and their limitations were discussed in section 1.9 above.

2.1.1 Total Fire Incidents Over Time

The number of fire incidents each year sufficient to warrant Fire Brigade attendance varies between about 15,000 and 30,000. In addition there are about 10,000 false alarms and a relatively small number of fires (about 1%) which are not attended by the Brigade at the time of the fire, but which require a Brigade report for insurance purposes. The pattern of incidents over time is illustrated in Figure 2:i. The average annual growth of fire incidents is about 2% to 3%, but there are significant variations in the level of incidents from year to year.

Figure 2:i Number of Fire Incidents, NSW, 1964 - 1985



Source: see over

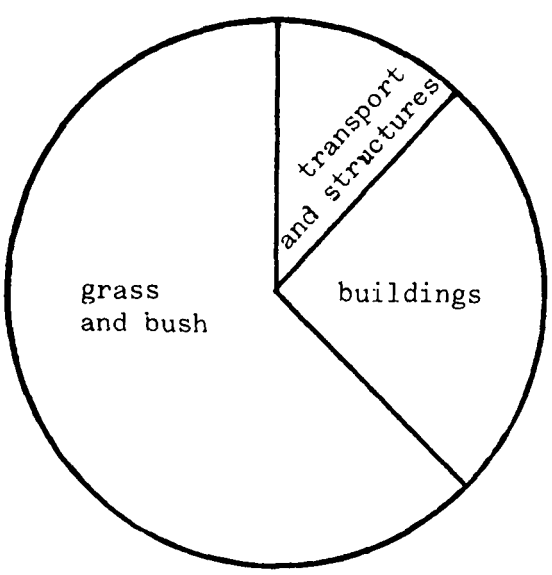
Sources:
- 1964-1973 Board of Fire Commissioners, NSW Fire Statistics (Annual)
- 1974-1980 Fire Statistics New South Wales (Annual)
- 1984 - NSWFB

Notes:
1. Up to 1975 Canberra was included in the total fire statistics for NSW. Fires in Canberra are deleted from the figures used to construct Figure 2:ii.
2. No statistics are available for 1981-1983 see Section 1.9 for details.
3. The Figure for 1984 is an estimate based on NSWFB statistics for nine months (April-December 1984). During this period there were 22,717 incidents, which on a simple annualised basis is 30,213. Because the first quarter of the year usually involves more grass or bush fires, this is probably an underestimate.

2.1.2 The Pattern of Fire Incidents by Type of Premises

Table 2:i gives an indication of the broad pattern of fire incidents by type of premises from 1975 to 1980. Most fires are grass and bush fires (65%), followed by buildings (22%), and transport and structures (13%). This is illustrated in figure 2:ii. Some increase in the proportion of transport related incidents may be detected over the period.

Figure 2:ii Relative Proportion of Fire Incidents by Property Type, 1975-1980



Source: Table 2:i

Table 2:i Fire Incidents by Broad Type of Property Affected 1975-1980

Property	1975		1976		1977		1978		1979		1980	
	n	%	n	%	n	%	n	%	n	%	n	%
Grass, Bush and rubbish	17,829	66	15,838	65	23,244	71	11,984	55	22,095	67	21,402	65
Buildings	5,781	22	5,472	24	5,723	18	6,125	28	6,172	19	6,722	20
Transport & Structures	3,051	12	2,819	11	3,635	11	3,844	17	4,630	14	4,834	15
TOTAL	26,471	100	24,129	100	32,602	100	21,963	100	32,897	100	32,958	100

Source: 1975-1980 Fire Statistics NSW

Note: percentage figures rounded

Table 2:ii Fire Incidents by Property Type
April-December 1984 (NSWFB)

Property	no.	%
Fixed Property		
0 Unclassified	732	3
1 public assembly	426	2
2 educational	163	1
3 institutional	132	1
4 residential	3,097	14
5 shop, office	623	3
6 basic industry	177	1
7 manufacturing	322	1
8 storage	749	3
9 special	8,764	40
Total Fixed	14,185	70
Mobile Property		
0 Unclassified	298	1
1 passenger road	2,957	14
2 freight road	207	1
3 rail	33	-
4 water	41	-
5 air	6	-
6 heavy equipment	34	-
7 special	77	-
8 other	2,728	13
Total Mobile	6,381	30
TOTAL	21,566	100%

Source: NSWFB Statistics

Note: percentages may not sum to 100% because of rounding

Directly comparable figures are not available for 1984. A more detailed breakdown of the pattern of fire incidents is given in table 2:ii for April to December 1984. Grass and bush fires are now mostly included in fixed property - special, and account for about 40% of fire incidents. Fires in residential properties and in passenger motor vehicles each constitute about 14% of all fire incidents. It is not clear why other mobile property accounts for such a large proportion of fire incidents, but it is most likely to be due to that classification being a catch all for incidents that cannot readily be classified.

A broadly similar pattern emerges from Police statistics for 1985. (See table 2:iii on the following page). Although the total number of incidents of fire reported by Police is only about one quarter of all fire incidents, grass and bush fires on public and private land account for the single greatest source (about 35%), while residential dwellings and flats account for 20% and motor vehicles 19%.

Table 2:iii Fire Incidents by Property Type April 1985 - March 1986 (NSW Police)

	No.	%
Dwelling	1,159	18
Unit/Flat	152	2
Other Living	147	2
Business	287	5
Retail	188	3
Factory/Warehouse	396	6
Educational	144	2
Other Government	93	1
Recreational	83	1
Cars	1,182	19
Trucks	57	1
Other Motor	165	3
Rail	28	-
Air	5	-
Other Transport	7	-
Grass, Forest, N.P.	488	8
Other land	1,730	27
Other premises	2	-
	6,313	100%

Source: NSW Police

2.1.3 The Pattern of Fire Incidents by Region

Table 2:iv indicates the proportion of fire incidents in country and metropolitan areas. Although the figures are not directly comparable they appear to be fairly consistent over time. About 60% of all fires occur within the Sydney metropolitan area, and about 70% to 80% of fires in buildings and structures occur within the Sydney metropolitan area.

Table 2:iv Percentage of Fire Incidents Metropolitan and Country

Year	% Sydney Metropolitan	% Country and other	Total incidents
1964 Note 1	56	44	26,358
65	58	42	24,721
66	56	44	16,517
67	57	43	18,135
68	59	41	30,318
69	63	37	15,589
70	56	43	30,676
71	60	40	29,462
72	38	42	25,901
73	60	40	24,812
74 Note 2	72	28	8,384
75	73	27	8,445
76	72	28	8,483
77	71	29	9,564
78	77	23	9,979
79	78	22	10,802
80	77	23	11,556
1980-1984 no data available			
84 Note 3	79	21	22,717
85-86 Note 4	62	38	6,313

Sources:

Note 1: Information for 1964-1973 is based on Board of Fire Commissioners of NSW Fire Statistics, NSW, Annual. The total figures include Canberra. Metropolitan is metropolitan Sydney only. Figures are based on all attendances of fires by brigades.

Note 2: Information for 1974-1980 is based on Fire Statistics NSW, Annual. Total figures are for fires in buildings and outdoor structures only, and do not cover all fires. Metropolitan refers to the Sydney Statistical Division.

Note 3: 1984 information is for 9 months for April to December 1984, NSWFB statistics. Metropolitan is based on local government areas in the Sydney (greater region). Figures cover all fires attended.

Note 4: 1985-86 information is from NSW Police and only covers fires reported to Police. Metropolitan includes Sydney Police divisions plus Gosford.

2.1.4 The Pattern of Identified Cause of Fire

It is difficult to describe the broad pattern of cause of fire with any certainty, for several reasons.

First, it is often conjectural as to what has "caused" a fire. For example, a simple case of burning rubbish or overheated oil "causing" a building to ignite may be variously regarded as anything from arson to design deficiency (e.g. in an incinerator, or in building construction).

Second, and closely related to the first reason, it depends on what resources are available to investigate and identify the underlying cause of the fire. For example, an overworked or insufficiently trained fire officer may report a fire as 'suspicious', or as 'misuse of ignition' rather than as 'incendiarism' simply because of the additional call on resources necessary to pursue a case of arson.

Third, the classification system influences the way fires are reported, and thus influences the apparent pattern. The system of classification has changed several times in the last 15 years within the NSW Fire Brigade, and is not comparable with the classification system adopted by NSW Police.

Table 2:v Cause of Fire Incidents

1984 Classification	1984	1980	1976	1976 and 1980 Classification
undetermined	6.5%	17.2%	16.5%	unknown
incendiarism	5.9%	4.9%	3.6%	incendiarism & suspicious
suspicious	12.8%			
misuse of ignition	41.9%	41.5%	45.7%	match, cigarette, firework
misuse of material	9.8%	18.4%	19.9%	controlled fire flammable or other hot substance cooking, food warming
mechanical failure	10.9%			transport, crash or collision
deficiency in design	1.4%	12.8%	12.9%	electrical supply equipment
operational deficiency	5.5%			tool equipment or appliance domestic appliance
natural condition	1.0%	3.9%		natural condition
other condition	3.9%		1.8%	other
TOTAL INCIDENTS	18,429	32,958	24,321	
	100%	100%	100%	

Notes: 1. Percentage may not add to 100% because of rounding
2. 1984 is for 9 months, April-December

Source: 1984 information: NSWFB Statistics
1980 and 1976: NSW Fire Statistics

Table 2:v gives a broad indication of the relative cause of fire incidents. The 1984 figures are not directly comparable to the other figures; the 1984 figures are based on a different classification system, and cover only a nine month period. The broad classification groupings adopted, and the way they are related in table 2:v are a little arbitrary. for example, not all incidents categorised prior to 1984 as "controlled fires" constitute "misuse of material" in the 1984 categorisation.

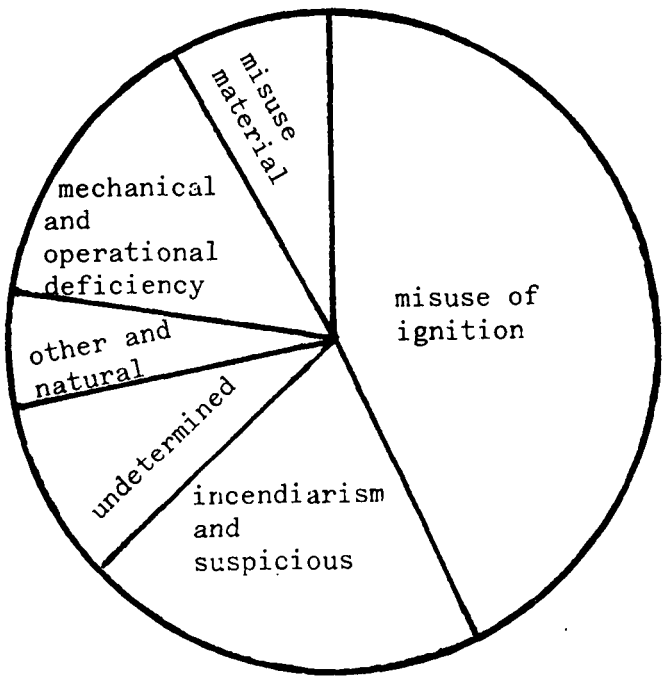
Nevertheless, a broad picture emerges which is illustrated in figure 2:iii. The main points to note are:

- The principal source of fires (about 40%) is misuse of ignition

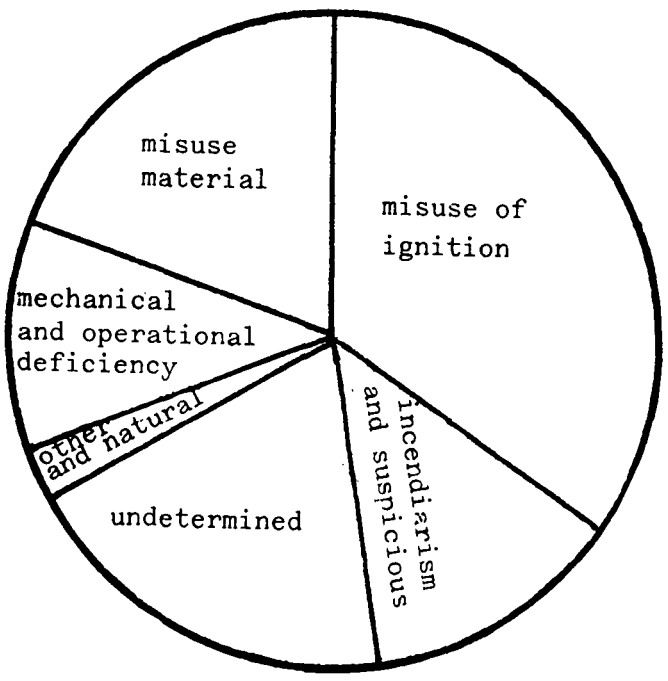
- The level of unknown or undetermined causes has dropped significantly over the period, from around 17% to about 6%

- The number of fire incidents due to incendiarism and suspicious circumstances has increased sharply, from about 4% to over 18%.

Figure 2:iii Cause of Fire Incidents: 1984 and 1976-1980



1984



1976-1980

2.2 The Pattern of Damage and Costs Associated with Fire

As discussed in detail in section 1.9, available estimates of the costs and damage associated with fire must be treated with considerable caution. The monetary values quoted in this section are based almost entirely on Police and Fire Brigade estimates. Fire Brigade personnel are not trained as loss estimators, and are understandably more concerned with saving life and property than with providing accurate estimates of damage or being concerned over conceptual niceties as to what is a cost and how to measure it. Similarly, Police Officers are more concerned with successful apprehension and prosecution of criminals than with precise estimates of damage and loss.

2.2.1 The Overall Pattern of Damage From Fire

Table 2:vi and Figure 2:iv serve to illustrate a major feature of the pattern of fire damage; the majority of fires cause relatively little damage, but 10% of the largest fire incidents cause over 90% of the damage. Put another way, 53% of small fire incidents caused less than 1% of damage.

This is also visually demonstrated in figure 2:iv. The reference line is the dotted line of even distribution; if all fires caused roughly the same amount of damage, then this line would represent the pattern. As it is however, there are a large number of fires which cause relatively small amounts of damage, and a handful of fires which cause relatively large amounts of damage, a tendency which appears to have been accentuated from 1976 to 1984.

Because of the paucity of the data it is difficult to make any assessment of whether the total damage due to fire has increased faster than the rate of incidents or the rate of inflation. Table 2:vii gives some indication of the average and total damage over the last eight years.

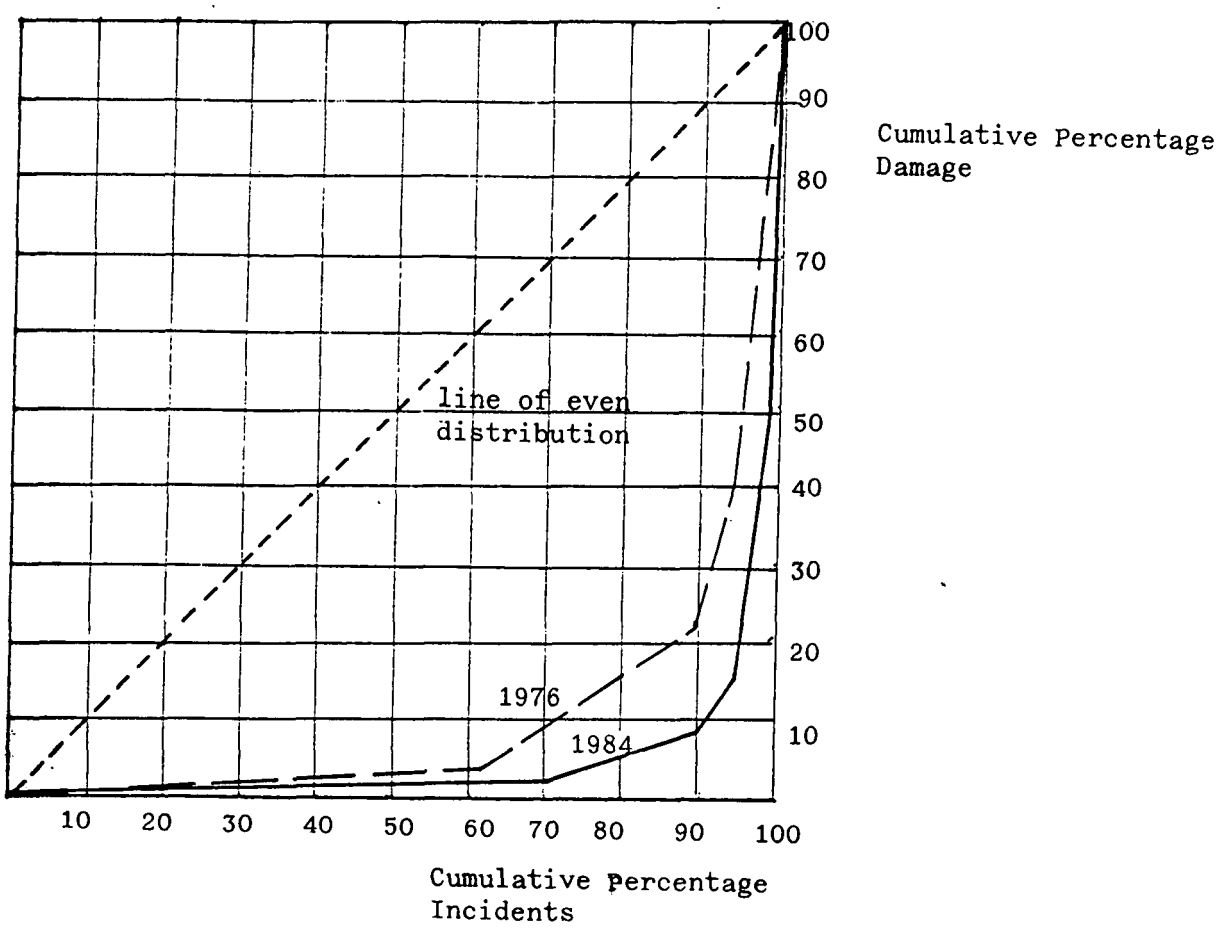
By comparison, Police statistics for 12 months over 1985/6 suggest the total damage attributable to just 6,313 incidents was in the order of $125m or around $19,800 per incident. The higher average damage figure is probably attributable to the Police being more likely to record more serious fires.

Table 2:vi Cumulative Percentages of Fire Incidents Compared with Cumulative Percentages of Damage from Fires in Buildings and Mobile Property

Band of Damage Estimate 1984	1984 cumulative % damage	1984 cumulative % incidents	1980 cumulative % damage	1980 cumulative % incidents	1976 cumulative % damage	1976 cumulative % incidents	Band of Damage estimate 1976-1980
$0 -$99	.3%	53%					
$100 -$999	1.4%	71%	1.5%	49%	3.5%	62%	under $500
$1000 -$9990	8.5%	92%	14%	86%	22%	90%	$501-$5000
$10000 -$24999	16%	95.5%	28%	95%	40%	96%	$5001 -$20000
$25000 -$49999	24%	97.3%	40%	97%	53%	97.5%	$20001 -$50000
$50000 -$249999	51%	99%	50%	98%	65%	98%	$50001 -$100000
$250000 -$999999	70%	99.7%	72%	99%	96%	99%	$100001 $500000
$1000000 -$4999999	88.7%	99.9%	89%	99.9%	100%	100%	$500001 -$1000000
$5000000 and above	100%	100%	100%	100%			$1000000 and above
TOTAL %	100%	100%	100%	100%	100%	100%	
TOTAL incidents	14,523		11,556		8,483		

Notes: 1. Damage estimates are based on midpoint of band
2. 1984 is for 9 months only
Source: 1984 - NSWFB 1980 & 1976 NSW Fire Statistics

Figure 2:iv Lorenze Curves for Fire Damage 1984, 1976



Source: Table 2:vi

Table 2:vii Damage to Property; Changes Over Time 1976-1984

	1984		1980		1976
Incidents	14,523		11,556		8,483
% increase		25.6%		36.2%	
Total damage	$129m		$94m		$37m
% increase		37%		162%	
Average damage	$8,882		$8,134		$4,361
% increase		9%		186%	

Notes: 1. 1984 is for 9 months only, thus % change between 1984 and 1980 is understated for incidents and damage.

2. Estimates for 1976 and 1980 are not directly comparable with 1984 because of inclusion of some special property and grass and bush in 1984 figures

Source: NSWFB Statistics
Fire Statistics NSW 1976, 1980

2.2.2 The Pattern of Damage by Type of Premises

A detailed breakdown of the pattern of property damage attributable to fire is given in Tables 2:viii, 2:ix and 2:x. Two main points emerge from these tables.

First, the main areas where property damage occur are dwellings, shop/offices, and passenger motor vehicles. These three categories comprise nearly 50% of all damage.

Second, most damage is concentrated in a relatively few incidents. As noted in the preceding section it is not unusual for the top 10% of incidents to account for around 90% of damage.

Table 2:viii

DAMAGE TO FIXED PROPERTY BY FIRE, April - December 1984 NSWFB STATISTICS

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY FIXED PROPERTY TYPE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more		
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000	Not Rep	TOTAL
0 Unclassified											
Cases	210	119	203	27	5	3	0	0	0	165	732
$'000	11	65	1117	473	188	450	-	-	-		2304
1 Public Assembly											
Cases	142	86	64	9	11	8	3	1	0	102	426
$'000	7	47	352	158	413	1200	1875	3000			7052
2 Educational											
Cases	60	28	26	13	6	7	1	0	0	22	163
$'000	3	15	143	228	225	1050	625	-	-		2289
3 Institutional											
Cases	58	30	15	0	0	0	0	0	0	29	132
$'000	3	17	83	-	-	-	-	-	-		103
4 Residential											
Cases	870	846	595	168	100	79	1	1	0	437	3097
$'000	44	465	3273	2940	3750	11850	625	3000	-		25938
5 Shop/Office											
Cases	149	119	125	47	40	30	7	2	2	102	623
$'000	7	65	688	823	1500	4500	4375	6000	10000		27958
6 Basic Industry, Utility											
Cases	71	20	18	10	2	1	0	0	0	55	177
$'000	4	11	99	175	75	150	-	-	-		514
7 Manufacturing											
Cases	79	57	75	23	15	16	4	1	1	51	322
$'000	4	31	413	403	563	2400	2500	3000	5000		14314
8 Storage Property											
Cases	200	169	222	27	14	12	3	1	0	101	749
$'000	10	93	1221	473	525	1800	1875	3000	-		8997
9 Special Property											
Cases	3726	204	173	24	14	8	9	2	0	4604	8764
$'000	186	112	952	420	525	1200	5625	6000	-		15020
TOTAL FIXED PROPERTY											
Cases	5565	1678	1516	348	207	164	28	8	3	5668	15185
Damage $'000	278	923	8338	6090	7763	24600	17500	24000	15000		104490

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

Table 2:ix

DAMAGE TO MOBILE PROPERTY BY FIRE, April-December 1984

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY MOBILE PROPERTY TYPE AND DAMAGE RANGE.

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000		
0 Unclassified											
Cases	132	33	19	9	1	4	0	0	0	100	298
$'000	7	18	105	158	38	600	-	-	-		925
1 Passenger Road Transport											
Cases	500	557	1326	85	12	17	3	2	0	454	2957
$'000	25	306	7293	1488	450	2550	1875	6000	-		19,989
2 Freight Road											
Cases	34	54	66	13	5	10	0	0	0	25	207
$'000	2	30	363	228	188	1500	-	-	-		2310
3 Rail											
Cases	11	6	6	2	2	0	0	0	0	6	33
$'000	1	3	33	35	75	-	-	-	-		147
4 Water											
Cases	10	4	11	5	2	3	0	0	0	6	41
$'000	1	2	61	88	75	450	-	-	-		1220
5 Air											
Cases	0	4	1	0	0	1	0	0	0	0	6
$'000	—	2	6	-	-	150	-	-	-		158
6 Heavy Equipment											
Cases	6	7	6	4	2	4	0	0	0	5	34
$'000	.3	4	33	70	75	600	-	-	-		785
7 Special Vehicles											
Cases	48	10	0	2	0	1	0	0	0	16	77
$'000	2	6	-	35	-	150	-	-	-		193
8 Other											
Cases	1394	266	179	44	37	40	11	2	0	755	2728
$'000	70	146	985	770	1388	6000	6875	6000	-		22,240
TOTAL MOBILE											
Cases	2135	941	1614	164	61	80	14	4	0	1367	6381
Damage $'000	107	518	8877	2870	2288	12000	8750	12000	-		47,500

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

Table 2:x

DAMAGE TO PROPERTY COMPLEXES BY FIRE, April - December 1984

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY COMPLEX TYPE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$15000	$625000	$3000000	$5000000		
1 Public Assembly											
Cases	102	25	31	2	0	1	0	0	0	162	323
$'000	5	14	171	35	-	150	-	-	-		375
2 Educational											
Cases	44	24	25	12	5	7	1	0	0	15	133
$'000	2	13	138	210	188	1050	625	-	-		2226
3 Institutional											
Cases	49	32	101	0	2	0	0	0	0	28	212
$'000	2	18	556	-	75	-	-	-	-		651
4 Residential											
Cases	678	692	517	139	94	73	5	2	1	366	2567
$'000	34	381	2844	2433	3525	10950	3125	6000	5000		34292
5 Office											
Cases	94	85	60	20	25	12	2	0	1	45	344
$'000	5	47	330	350	938	1800	1250	-	5000		9720
6 Power etc											
Cases	26	10	14	4	5	3	0	0	0	36	98
$'000	1	6	77	70	188	450	-	-	-		792
7 Industrial											
Cases	45	38	62	17	14	16	1	1	1	36	231
$'000	2	21	341	298	525	2400	625	3000	5000		12212
8 Storage											
Cases	21	18	19	9	4	7	1	0	0	11	90
$'000	1	10	105	158	150	1050	625	-	-		2099
9 Special											
Cases	4161	761	1220	135	38	53	10	5	0	4525	10908
$'000	208	419	6710	2363	1425	7950	6250	15000	-		40325
TOTAL COMPLEX											
Cases	5220	1685	2049	338	187	172	20	8	3	5224	14906
$'000s	261	927	11270	5915	7013	25800	12500	24000	15000		102689

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

The categorisations used in tables 2:viii, ix and x overlap, so that there is some double counting of fires, particularly those which involve the use of "complex" categories.

No comparable damage estimates by premises are available for the period prior to 1984.

2.2.3 The Pattern of Damage by Region

Police data for 1985/6 indicate that about 62% of fire incidents occur in the metropolitan region, and that these account for about 65% of damage. Fire Brigade data suggest a somewhat higher concentration in the metropolitan area; about 75% of fire incidents, and these are responsible for about 73% of the total damage.

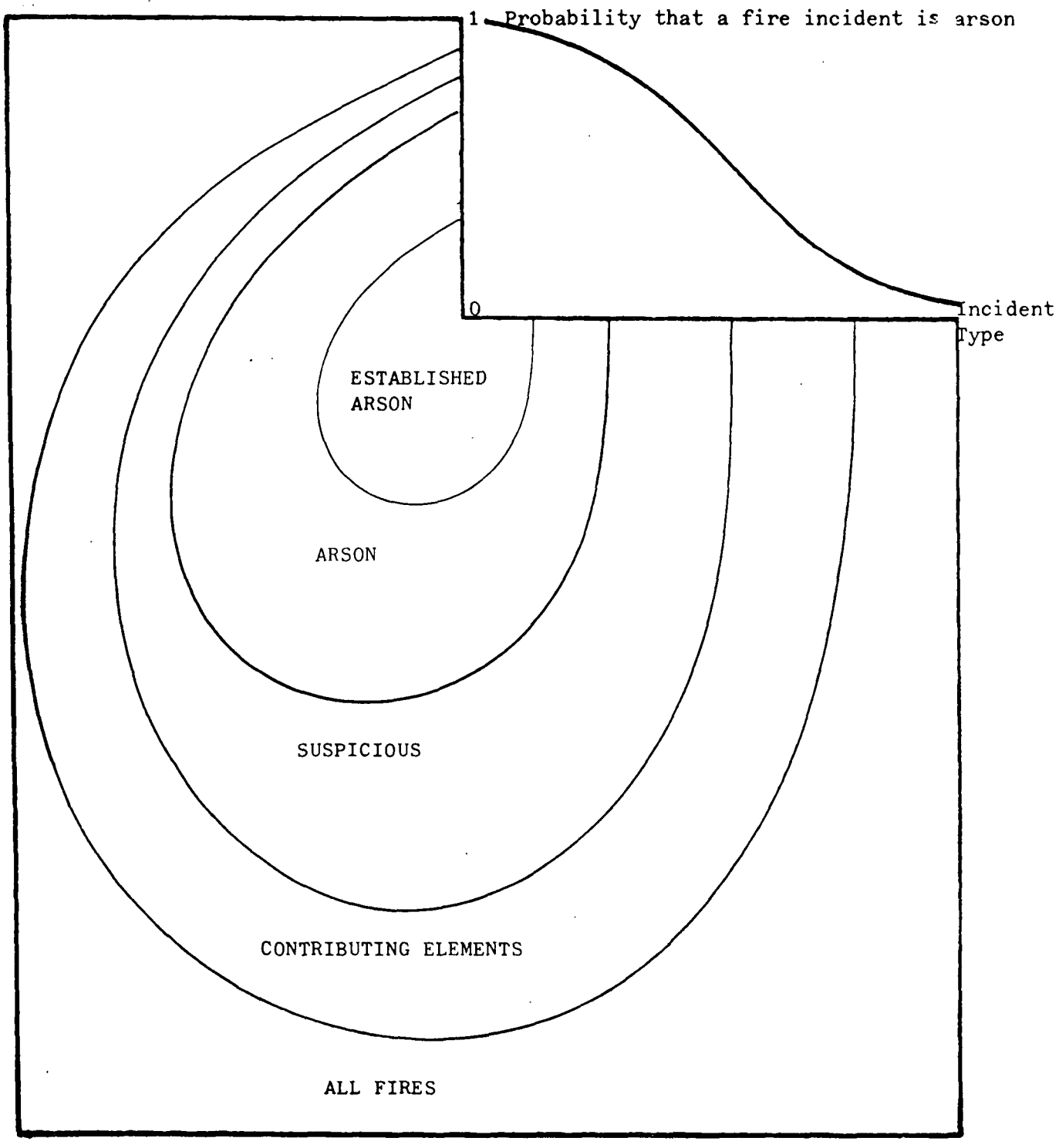
3. THE PATTERN OF DAMAGE TO PROPERTY FROM ARSON

3.1 Problems in Identifying Arson: Approach and Assumptions

It is often difficult to establish the existence of arson with any certainty. Arson inherently tends to destroy evidence and emergency crews at the scene of a fire are usually more concerned with limiting damage and danger to life than with collecting evidence. Arson is a crime, and from a strict legal standpoint, a fire cannot be categorised as arson unless a court accepts a standard of criminal proof. Using a strict legal interpretation means that the established incidence of arson is very low. Using a strict legal definition of arson will then give a precise result, but one which does not reflect the underlying pattern of arson activity.

As a consequence we have adopted a less precise, more fuzzy approach which is illustrated in Figure 3.i. The innermost circle represents cases of actual arson, as established in the courts. The next layer represents fire incidents which are not proven, but which are regarded by fire brigade and police personnel as almost certainly due to arson. The third layer represents fires which arouse suspicion, even though there is no clear evidence of deliberate intent. The final circle represents fires where there is some probability of an element of arson.

Figure 3:i


1
Probability that a fire incident is arson
0
Incident Type
ESTABLISHED ARSON
ARSON
SUSPICIOUS
CONTRIBUTING ELEMENTS
ALL FIRES

Not all of the fires included within these four sets can be said to be arson. Obviously all fires in the innermost circle are arson, but perhaps only 10% to 20% of those in the outer circle are, and perhaps only 50% of those fire considered suspicious are in fact likely to be able to be shown to be arson, given that the necessary time and resources be made available to investigate and prosecute.

3.2 The Pattern of Incidents and Level of Arson

Table 3:i gives an indication of the broad pattern of arson over time. The number of fire incidents regarded as incendiarism or as suspicious has roughly doubled about every eight years. A significant number of fire incidents due to people under 16 are apparently deliberately lit fires, although the exact number is not know. The proportion of fire incidents attributable to under 16's has increased more slowly than that attributable to arson, but it more than doubled over the period from 1964 to 1980. Fires of unknown origin increased fourfold over the same period. Not all fires of unknown origin are necessarily due to arson, and to some extent the increase may be attributed to lack of the staff resources necessary to establish the cause. However, since arson is often difficult to detect, a significant number of "cause unknown" fires may in fact be due to arson.

Overall, the proportion of fire incidents that are attributable to arson with a degree of certainty was relatively small up to 1980, around 5%. However, about another 40% of incidents may have contained an element of arson.

Although more recent information is not directly comparable with that in Table 3:i, there is some evidence that the upward trend in arson is continuing. Table 3:ii summarises the most recent available evidence from Police and Fire Brigade sources. Fire Brigade information suggests that the level of arson and suspicious fires has increased to around 18% of all fire incidents, compared with a level of only about 5% in 1980. Of a further 33% of fire incidents a significant, but unknown proportion is likely to be due to arson. The level of fires of undetermined cause has dropped sharply, from 17% in 1980 to only 5.5% in 1984. This decline in the undetermined category corresponds fairly closely to the rise in the combined arson and suspicious categories. We are unable to establish whether the increase in the apparent level of arson is due to better

investigative and reporting mechanisms, but we believe a significant proportion of it may well be.

Table 3:i Proportion of Fire Incidents Likely to be Attributable to Arson 1974-1980

Year	% Incendiarism or suspicious	% Under 16	% Unknown	Total Fire Incidents
1964	1.2	10.8	3.6	26,358
1965	1.3	10.4	4.2	24,721
1966	1.4	9.3	9.1	16,517
1967	1.3	9.6	13.1	18,135
1968	1.4	10.7	11.3	30,318
1969	2.5	6.8	9.9	15,589
1970	1,8	13.4	8.3	30,676
1971	1.9	17.5	10,3	27,462
1972	2.3	16.6	12.2	25,901
1973	2.3	16.7	11.6	24,812
1974	n.a	n.a	n.a	26,397
1975	3.7	23.9	14.6	26,653
1976	3.6	24.4	16.1	24,321
1977	3.7	25.2	17.5	32,808
1978	5.1	n.a	17.5	21,763
1979	4.7	n.a	18.3	32,897
1980	4.9	n.a	17.1	32,958

Notes: n.a - not available

Source: 1964-1974 Board of Fire Commissioners of NSW Fire Statistics

1975-1980 Fire Statistics NSW

Table 3:ii Proportion of Fire Incidents Likely to be Associated with Arson 1984, 1985/86

	NSW Fire Brigade (1984) %	NSW Police (1985/6) %	
Incendiary	5.8	47.8	Deliberately lit
Suspicious	12.9	8.7	Suspicious
Misuse of ignition; Under 16's	22.5		
Misuse of Material Ignited; Under 16's	5.5		
Undetermined	5.5	13.4	Undetermined
Other Causes	47.8	30.1	Other Causes
TOTAL INCIDENTS	18,429 100%	6,313 100%	

Notes: 1 Police and Fire Brigade figures are not directly comparable, and are only shown here as indicative. See text for details. NSWFB figures relate to April-December 1984. Police figures relate to 12 months from 1/4/85 to 31/3/86

Sources: Police - NSW Police Department
Fire Brigade - NSW Fire Brigade

The police data suggests a substantially higher level of arson activity than the Fire Brigade data. Because no Police data are readily available for the period prior to 1985 it is not possible to assess any trend. The very high proportion of arson (47.8%) and suspicious (8.7%) fire incidents recorded by the Police is not comparable with the Fire Brigade information in Tables 3:i and 3:ii, for two reasons

1. The Police tend to be primarily concerned with major fires, and incidents where a crime is likely to have occurred, hence, the Police figures for arson are based on a subset of total fire incidents and that subset is biased towards more significant fires where there is also some evidence of criminal activity

2. The two sets of figures are drawn from different time periods. The Fire Brigade figures relate to a 9 month period from April to December 1984, while the Police figures relate to a 12 month period from April 1985 to March 1986 inclusive. In the absence of an overlapping period of Fire Brigade and Police data, it is not possible to really compare and assess the consistency of the two sources.

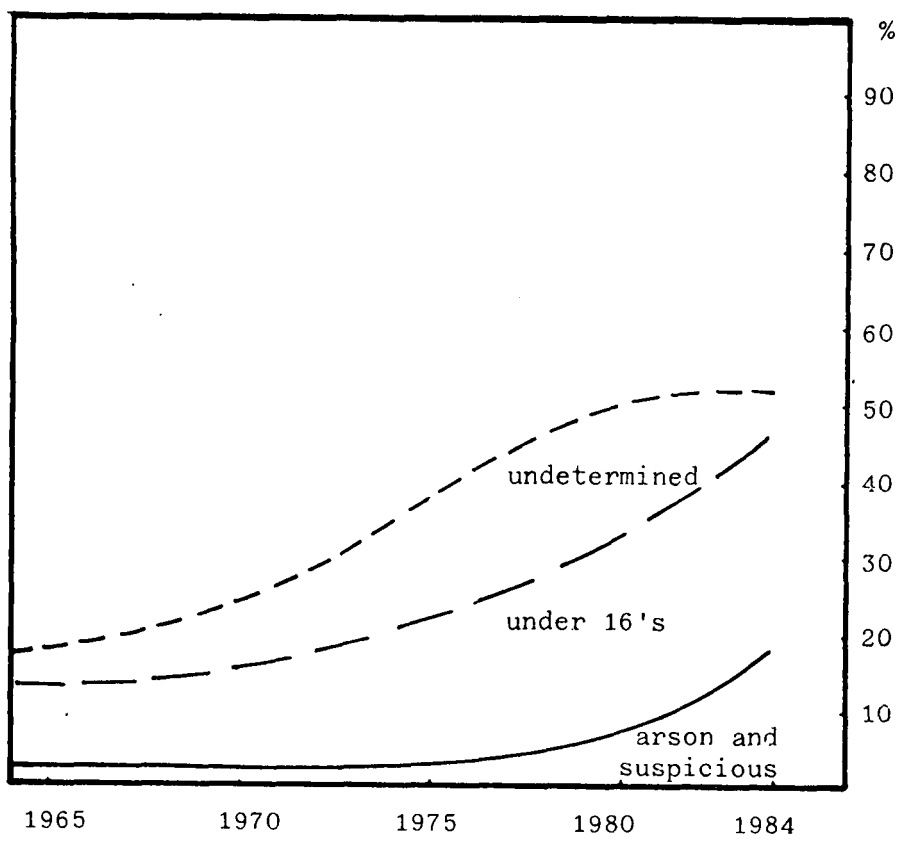
In very broad terms, some perspective may be gained from the following: There are about 25,000 to 30,000 fire incidents each year in NSW, and if the Fire Brigade assesses 18 to 19% of these as arson or suspicious then that represents about 4,000 to 5,000 reasonably likely cases of arson. The Police appear to investigate around 6,500 fire incidents, or about 20% to 25% of the total, and regard about 55% of these incidents as arson or suspicious, that is, about 3,500 likely arson cases. In effect both Police and Fire Brigade sources appear to be pointing to there being about 4,000 or so fire incidents which may reasonably be attributed to arson, or about 17% of total incidents. A further 30% or so of fire incidents may contain some element of arson, but it is difficult to establish how important this element is.

This clearly suggests a fairly significant rise in the apparent level of arson since the 1960's. This increase, as is common to most criminal activity, may be attributed to two factors;

1. The level of investigative activity
2. The actual or real level of arson

At this stage we have no reliable way of separating these two factors. Some case can be made that whilst most of the sudden increase in the apparent level of arson (from 5% in 1980 to around 17% in 1984) is due to improved investigation and recording, there is an underlying trend of increasing arson activity which suggests a progressive acceleration since the 1960's. This is illustrated in figure 3:ii

Figure 3:ii Proportion of fire incidents associated with arson 1965 - 1984



Source: Tables 3:i and 3:ii

3.3 The Pattern of Cost Associated with Arson

3.3.1 Available Information and the Pattern of Costs

As was outlined in section 1.6 there are seven basic categories of cost associated with arson;

infrastructure costs
construction and purchase costs
premium costs
investigation and extinguishing costs
insurance payout costs
disruption costs
and replacement costs

The only readily available information on the costs of arson is Fire Brigade and Police estimates of damage. These estimates are usually made by investigating officers or emergency crews at the scene of the fire, and the basis used for estimating damage may vary widely. Overall however it is probably reasonable to suppose that the damage estimates are usually based on some concept of replacement cost or insurance payout cost and thus broadly reflect these two cost categories.

3.3.2 The Pattern of Costs of Arson Over Time and Overall

There is virtually no accessible information on the costs associated with arson prior to 1984. What little information there is is contained in Table 3:iii, which suggests that in the 1960's and 70's not only was the level of arson relatively low, but a significant proportion of arson incidents caused little or no damage.

Table 3:iii Proportion of Arson Incidents Causing No or Negligible Damage

Year	Number of Arson Incidents	Percentage causing no. of negligible damage
1964	321	52%
1965	315	47%
1966	239	35%
1967	240	41%
1968	426	48%
1969	396	32%
1970	559	33%
1971	583	41%
1972	600	30%
1973	592	30%

Source: NSW Board of Fire Commissioners Fire Statistics

Table 3:iv provides a summary of the overall pattern of costs associated with arson in 1984 and 1985/6 as based on NSW Fire Brigade and Police estimates.

Several points are worth noting about Table 3:iv.

First, there is a marked difference in the apparent pattern of incidents and damage as revealed by Fire Brigade information relative to the pattern revealed by Police information. Closer inspection however indicates that there is more corroboration between the two sets of figures than might first appear. The Fire Brigade figures point to about 18% of all incidents being incendiary or suspicious, while the Police figures suggest 56% of cases they investigate are deliberately lit (incendiary) or suspicious. As argued in the preceding section, these two figures are broadly consistent with there being about 4,000 arson/suspicious cases each year out of a total of around 25,000 or so fire incidents. The apparent discrepancy (18% versus 56%) arises because the Police only investigate a quarter of all fire incidents.

Table 3:iv Overall Pattern of Arson Incidents and Cost

	NSW Fire Brigade (1984)		NSW Police (1985/6)		
	% cases	% damage	% cases	% damage	
Incendiary	5.8	9.3	47.8	23.2	deliberately lit
Suspicious	12.8	31.4	8.7	15.7	suspicious
Misuse of ignition	41.9	10.4			
Children under 16	(22.4)	(4.1)			
Misuse Material Ignited	9.8	6.3			
Children under 16	(5.4)	(3.1)			
Undetermined	6.5	13.4	13.4	31.9	undetermined
Other, including fires where no report is made	22.9	29.1	30.1	29.1	other
Total Cases	18,429 (11,988)		6,313		
Total Damage $ million		$113m		$125m	

Notes to Table 3:iv:

1. Police and Fire Brigade data are based on different time periods and incidents and are not directly comparable.

notes to table 3:iv continued

2. Percentage figures under Fire Brigade do not sum to 100% because 'Children under 16' categories are also counted under the two respective categories of misuse.

3. NSWFB figures relate to 9 months April-December 1984. NSW Police figures relate to 12 months April-March 1985/6

4. There is an apparent discrepancy in NSWFB Statistics supplied. On breakdown by property there were 14,523 incidents for which an estimate of damage was recorded. This breakdown forms the basis of Table 2:vi, 2:vii and Figure 2:iv. On breakdowns by cause of fire, there were 18,429 incidents, of which a damage figure was recorded for 11,988. The average damage for each incident where damage is recorded in the first case is $7,780 and in the second $9,426. This may be compared with an average damage figure of $19,800 for Police.

At the same time the Fire Brigade figures suggest that about 41% of damage is attributable to incendiary and suspicious fires, while the Police data suggest a figure of about 39%. The total damage estimates are roughly similar; the Fire Brigade data indicates a total monetary estimate of $113m for 9 months (about $150m for a full year) while the Police data suggests about $125m. Given that the time periods covered are different for the different sets of data, and given that the Police data only relates to 25% of, presumably, the more important fire incidents, the two sets of damage estimates are not totally at variance. What both point to is a cost estimate of arson and suspicious fires in the order of $50m to $65m p.a. in 1984/5 terms.

Second, there is a marked difference between Fire Brigade and Police estimates of the level and cost of actual arson per se. The Fire Brigade cites only 5.8% of cases as actual arson, corresponding to about 1,400 certain arson cases per year. The Police cite 47.8% of cases as deliberately lit, or about 3,000 cases per year. Similarly Fire Brigade damage estimates of arson

are about $14m p.a. (9.3% of about $150m), while Police estimates of damage from arson are about $28m p.a. (23.2% of about $125m). It is difficult to compare the two data sets because they cover different time periods and do not overlap, hence it may be that some of the discrepancy is attributable to the accelerating growth of arson. The fact that both the level of incidents and the size of the damage estimate for Police is about double the Fire Brigade estimates leads us to believe that most of the difference is due to an understandable orientation on the part of the Police towards prosecution.

Third, some case can be made that the average damage associated with arson and suspicious fires is above the average damage for all fire incidents. As was noted in section 2.4.1 and illustrated in Figure 2:iv, the distribution pattern of damage from fire is substantially skewed; the top 10% of fires account for more than 90% of damage. Table 3:iv suggests that arson and suspicious fires contribute disproportionately to the top end of this distribution. In terms of the Fire Brigade data, this is readily seen by the percentage of incidents for each of the categories arson and suspicious; 5.8% of incidents contribute 9.3% of the damage for the arson category, while the percentages for the suspicious category are 12.8% and 31.4% respectively.

The overall average damage per incident is higher for Police, about $19,800, and the average damage for arson and suspicious incidents is less than the average, about $14,200. This latter figure which is still greater than the overall Fire Brigade average cost per incident, and the generally higher Police figures probably reflect the orientation to prosecution.

Fourth, whilst children under 16 contribute substantially to fire incidents (almost 28% of fire incidents are due to under 16's) the contribution to damage is relatively minor; only 7.2% of damage is due to under 16's, and not all that would be due to arson.

A more detailed breakdown of the pattern of damage associated with arson is provided in Table 3:v.

Table 3:v CAUSE OF DAMAGE BY FIRE, APRIL-DECEMBER 1984 NSWFB STATISTICS

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY CAUSE OF FIRE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000		
INCENDIARY											
Cases	391	94	286	31	20	9	2	0	1	246	1080
$'000	20	52	1573	543	750	1350	1250	-	5000		10538
SUSPICIOUS											
Cases	617	256	708	117	37	44	4	3	2	588	2376
$'000	31	141	3894	2048	1388	6600	2500	9000	10000		35602
MISUSE OF IGNITION											
Cases	3388	472	326	36	25	12	10	0	0	3456	7725
$'000	169	260	1793	630	938	1800	6250	-	-		11840
of which children 16 & under											
Cases	1766	100	70	11	5	0	6	0	0	2183	4141
$'000	88	55	385	193	188	-	3750	-	-		4659
MISUSE MAT IGNITED											
Cases	694	178	135	16	13	12	1	1	0	759	1809
$'000	35	98	743	280	488	1800	625	3000	-		7069
of which children 16 & under											
Cases	407	27	22	4	2	2	0	1	0	542	1007
$'000	20	15	121	70	75	300	-	3000	-		3601
UNDETERMINED											
Cases	355	83	119	21	16	9	2	2	1	595	1203
$'000	18	46	655	368	600	1350	1250	6000	5000		15287
OTHER											
Cases	1185	1134	842	153	52	61	8	3	0	797	4235
$'000	59	624	4631	2678	1950	9150	5000	9000	-		33092
TOTAL											
Cases	6630	2217	2416	374	163	147	27	9	4	6441	18429
$'000	332	1219	13288	6545	6113	22050	16875	27000	20000		113422

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

3.3.3 The Pattern of Costs of Arson by Type of Property

Table 3:vi shows the general pattern of incidents and damage arising from arson and from suspicious fires according to the type of property. The main points which emerge from this Fire Brigade data are:

1. Shop/office property is where most damage is concentrated. About 30% of the total damage arises from only about 5% of incidents.

2. Passenger motor vehicles represent a large proportion of both incidents and damage, accounting for nearly 34% of incidents and about the same percentage of arson damage

3. Residential property and manufacturing property contribute disproportionately and significantly to damage.

A broadly similar picture emerges from Police data, as shown in Table 3:vii. Although the categories are different in Police records, it is clear that the major areas of significant damage are again

- Business (including retail which contributes about 40 to 50% of total damage from only about 7% of incidents,

- Passenger cars, and

- Dwellings

The Police data suggests that arson damage to educational property and to private and public land (grass and bush fires) is somewhat more serious than is indicated by the Fire Brigade data.

Table 3:vi Percentage of Incidents and Damage due to Arson and Suspicious Fires by Type of Property April-December 1984; Fire Brigade Data

Property Type	Arson		Suspicious	
	% incidents	% damage	% incidents	% damage
FIXED PROPERTY				
Public assembly	2.9	3.8	2.3	3.4
Educational	1.3	2.9	1.6	4.5
Institutional	-	-	.3	-
Residential	6.9	14.0	8.0	6.6
Shop/office	5.0	33.7	4.5	31.5
Basic Industry/ Utility	0.9	0.65	.3	-
Manufacturing	0.5	3.1	1.0	15.2
Storage property	5.5	5.5	4.8	3.5
Special	27.9	7.1	27.1	3.5
MOBILE PROPERTY				
Passenger vehicles	34.0	34.0	35.8	11.3
Trucks	1.1	1.0	1.3	1.2
Special	10.5	6.2	6.7	4.8
Total %	100%	100%	100%	100%
Total incidents	1,080		2,376	
Total damage $000		10,538		35,602

Notes: 1. The percentage damage figures for arson are distorted by one incident in the shop/office category which accounts for almost half of the total damage (i.e. $10.5 million) Percentage damage figures shown here are calculated with that incident deleted.

2. This table only shows NSW Fire Brigade estimates.

Source: Tables 3:viii to 3:xi

Table 3:vii Percentage of Incidents and Damage due to Arson and Suspicious Fires by Type of Property; April 1985-March 1986; Police Data

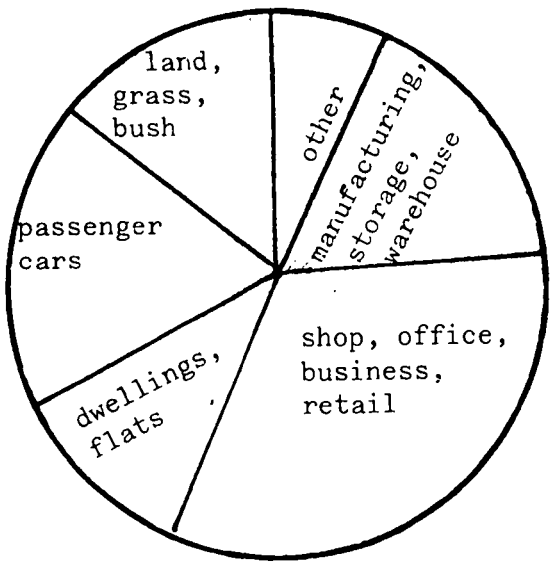
	Deliberately Lit		Suspicious	
	% incidents	% damage	% incidents	% damage
Dwellings	7.4	10.0	17.2	9.5
Units/Flats	1.4	0.9	2.2	0.3
Other Living	1.4	0.8	1.9	0.3
Business	4.0	27.6	5.8	54.2
Retail	2.8	14.0	4.2	2.2
Factories/Warehouses	3.6	9.1	7.8	8.9
Educational	3.6	7.5	3.2	10.5
Other Government	1.5	2.9	3.1	3.1
Recreational	1.4	3.3	1.9	4.0
Cars	26.2	13.4	13.2	18.9
Trucks	0.7	1.8	-	-
Other Motor	1.9	1.1	2.9	0.7
Rail	0.4	-	-	-
Air	-	-	-	-
Other Transport	-	-	-	-
Grass Forest	6.9	3.1	10.1	0.5
Other Land	35.2	16.3	26.0	3.5
Total %	100%	100%	100%	100%
Total incidents	3,019		552	
Total damage $000		29,105		19,768

Notes: Percentage figures may not add to 100% due to rounding

Source: NSW Police

A broad composite picture of the arson damage by property type is depicted by Figure 3:iii.

Figure 3:iii Proportion of Costs of Arson in Different Areas of Property



Source: Tables 3:vi and 3:vii

A more detailed breakdown of the pattern of costs associated with arson is shown in Tables 3:viii to 3:xv. The basic picture of the pattern of arson by type of property remains essentially unchanged as a result of these additional tables, that is the main damage areas are as outlined above; viz shops, businesses, cars and dwellings.

These detailed tables also give some further insight as to the possible role of under 16's in arson. As was noted in table 3:iv, children under 16 generate a significant proportion of fire incidents, but most of these cause relatively little damage. It is not possible to assess what proportion of these are arson, but it is of interest that the general pattern of damage to property by under 16's is not the same as the overall pattern of arson damage. Most under 16 initiated damage is to dwellings (31%) cars (10%) and special property (mostly grass and bush, 13%). Contrary to what might be expected, under 16's do not appear to contribute disproportionately to either incidents or damage to educational, institutional and government property.

Table 3:viii Damage to Fixed Property by Fire, April - December 1984 NSWFB Statistics - Incendiary

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY FIXED PROPERTY TYPE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000		
0 Unclassified											
Cases	152	50	205	17	4	0	0	0	0	116	544
$'000	8	28	1128	298	150	-	-	-	-		1612
1 Public Assembly											
Cases	12	5	7	1	0	1	0	0	0	6	32
$'000	1	3	39	18	-	150	0	0	0		211
2 Educational											
Cases	4	1	3	2	3	0	0	0	0	1	14
$'000	0	1	17	35	113	-	-	-	-		165
3 Institutional											
Cases	0	0	0	0	0	0	0	0	0	1	1
$'000	-	-	-	-	-	-	-	-	-		-
4 Residential											
Cases	21	18	13	1	6	3	0	0	0	12	74
$'000	1	10	72	18	225	450	-	-	-		776
5 Shop/Office											
Cases	11	3	11	4	5	2	2	0	1	15	54
$'000	1	2	61	70	187	300	1250	-	5000		6871
6 Basic Industry, Utility											
Cases	4	1	0	2	0	0	0	0	0	3	10
$'000	1	1	-	35	-	-	-	-	-		36
7 Manufacturing											
Cases	1	1	1	1	0	1	0	0	0	1	6
$'000	1	1	6	18	0	150	-	-	-		174
8 Storage Property											
Cases	12	9	17	1	1	1	0	0	0	2	43
$'000	1	5	94	18	38	150	-	-	-		306
9 Special Property											
Cases	174	6	29	2	1	1	0	0	0	89	302
$'000	9	3	160	35	38	150	-	-	-		396
TOTAL FIXED PROPERTY											
Cases	391	94	286	31	20	9	2	0	1	246	1080
Damage $'000	20	52	1573	543	750	1350	1250	-	5000		10538

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

Table 3:ix **Damage to Mobile Property by Fire, April - December 1984 NSWFB Statistics - Incendiary**

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY MOBILE PROPERTY TYPE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000		
0 Unclassified											
Cases	253	46	60	11	12	5	2	0		180	569
$'000	13	25	330	193	450	750	1250	-			3011
1 Passenger Road Transport											
Cases	53	41	209	16	4	2	0	0	0	50	375
$'000	3	23	1150	280	150	300	-	-	-		1096
2 Freight Road											
Cases	2	1	7	1	0	0	0	0	0	1	12
$'000	.1	1	39	18	-	-	-	-	-		58
3 Rail											
Cases	0	0	0	0	0	0	0	0	0	1	1
$'000	-	-	-	-	-	-	-	-	-		-
4 Water											
Cases	0	0	0	1	0	0	0	0	0	0	1
$'000	-	-	-	18	-	-	-	-	-		18
5 Air											
Cases											
$'000											
6 Heavy Equipment											
Cases	0	0	0	1	1	1	0	0	0	0	3
$'000	-	-	-	18	38	150	-	-	-		206
7 Special Vehicles											
Cases	3	1	0	0	0	0	0	0	0	0	4
$'000	.15	1	-	-	-	-	-	-	-		1
8 Other											
Cases	80	5	10	1	3	1	0	0	0	14	114
$'000	4	3	55	18	113	150	-	-	-		343
TOTAL MOBILE PROPERTY											
Cases	391	94	286	31	20	9	2	0	0	246	1079
Damage $'000	20	53	1574	545	751	1350	1250	-	-		5543

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

Table 3:x Damage to Fixed Property by Fire, April - December 1984 NSWFB Statistics - Suspicious

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY FIXED PROPERTY TYPE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000		
0 Unclassified											
Cases	285	122	500	41	6	6	0	2	0	221	1184
$'000	15	67	2750	718	225	90	-	6000	-		9865
1 Public Assembly											
Cases	8	10	10	6	3	2	1	0	0	15	55
$'000	.4	6	55	105	113	300	625	-	-		1204
2 Educational											
Cases	6	8	9	5	2	5	1	0	0	4	40
$'000	.3	4	50	88	75	750	625	-	-		1517
3 Institutional											
Cases	4	3	0	0	0	0	0	0	0	0	7
$'000	.2	2	-	-	-	-	-	-	-		2
4 Residential											
Cases	40	39	42	30	10	10	0	0	0	20	191
$'000	2	21	231	525	75	1500	-	-	-		2354
5 Shop/Office											
Cases	12	14	32	15	9	12	1	1	1	11	108
$'000	.6	8	176	263	338	1800	625	3000	5000		11210
6 Basic Industry, Utility											
Cases	5	0	0	0	0	0	0	0	0	3	8
$'000	.25	-	-	-	-	-	-	-	-		.25
7 Manufacturing											
Cases	3	4	7	3	4	1	0	0	1	1	24
$'000	.15	2	39	53	150	150	-	-	5000		5394
8 Storage Property											
Cases	12	19	60	10	3	6	0	0	0	5	115
$'000	.6	10	33	175	113	900	-	-	-		1231
9 Special Property											
Cases	242	37	48	7	0	2	1	0	0	308	645
$'000	12	20	264	12	-	300	625	-	-		1233
TOTAL FIXED PROPERTY											
Cases	617	256	708	117	37	44	4	3	2	588	2377
Damage $'000	31	141	3894	2048	1388	6600	2500	9000	10000		35602

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

Table 3:xi Damage to Mobile Property by Fire, April - December 1984 NSWFB Statistics - Suspicious

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY MOBILE PROPERTY TYPE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000		
0 Unclassified											
Cases	430	128	176	69	27	29	3	2	2	454	1320
$'000	22	71	88	1208	1013	4350	1875	6000	10000		24627
1 Passenger Road Transport											
Cases	112	98	498	34	1	4	0	1	0	102	851
$'000	.56	54	2739	595	38	600	-	3000	-		7027
2 Freight Road											
Cases	5	5	13	4	0	2	0	0	0	3	32
$'000	.25	3	72	70	-	300	-	-	-		445
3 Rail											
Cases	1	0	0	0	2	0	0	0	0	0	3
$'000	.05	-	-	-	75	-	-	-	-		75
4 Water											
Cases	0	0	1	1	0	1	0	0	0	0	3
$'000	-	-	6	18	-	150	-	-	-		174
5 Air											
Cases											
$'000											
6 Heavy Equipment											
Cases	0	1	0	1	0	0	0	0	0	0	2
$'000	-	1	-	18	-	-	-	-	-		19
7 Special Vehciles											
Cases	6	0	0	0	0	0	0	0	0	1	7
$'000	.3	-	-	-	-	-	-	-	-		.3
8 Other											
Cases	63	24	20	8	7	8	1	0	0	28	159
$'000	3	13	110	140	263	1200	625	-	-		2354
TOTAL MOBILE PROPERTY											
Cases	617	256	708	117	37	44	4	3	2	588	2377
Damage $'000	26	142	3015	2049	1389	6600	2500	9000	10000		34721

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

Table 3:xii **Damage to Fixed Property by Fire, April - December 1984 NSWPB Statistics - Misuse/Ignition Children 16 & Under**

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY FIXED PROPERTY TYPE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000		
0 Unclassified											
Cases	267	18	17	3	2	0	0	0	0	533	840
$'000	13	10	94	53	75	-	-	-	-		245
1 Public Assembly											
Cases	28	3	4	0	0	0	0	0	0	14	49
$'000	1	2	22	-	-	-	-	-	-		25
2 Educational											
Cases	14	3	1	0	0	0	0	0	0	5	23
$'000	.7	2	6	-	-	-	-	-	-		9
3 Institutional											
Cases	1	0	2	0	0	0	0	0	0	3	6
$'000	.05	-	11	-	-	-	-	-	-		11
4 Residential											
Cases	50	27	33	6	2	0	0	0	0	22	140
$'000	3	15	182	105	75	-	-	-	-		380
5 Shop/Office											
Cases	12	4	2	0	0	0	0	0	0	4	32
$'000	.6	2	11	-	-	-	-	-	-		14
6 Basic Industry, Utility											
Cases	9	0	0	0	1	0	0	0	0	6	16
$'000	.45	-	-	-	38	-	-	-	-		38
7 Manufacturing											
Cases	7	1	0	0	0	0	0	0	0	2	10
$'000	.35	1	-	-	-	-	-	-	-		1
8 Storage Property											
Cases	33	17	4	1	0	0	0	0	0	12	67
$'000	2	9	22	18	-	-	-	-	-		51
9 Special Property											
Cases	1361	27	7	1	0	0	0	0	0	1582	2978
$'000	69	15	39	18	-	-	-	-	-		141
TOTAL FIXED PROPERTY											
Cases	1782	100	70	11	5	0	0	0	0	2183	4151
Damage $'000	89	55	385	193	188	-	-	-	-		910

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

Table 3:xiii Damage to Mobile Property by Fire, April - December 1984 NSWFB Statistics - Misuse/Ignition Children 16 & Under

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY MOBILE PROPERTY TYPE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000		
0 Unclassified											
Cases	1199	67	41	9	4	0	0	0	0	1884	3204
$'000	60	37	226	158	150	-	-	-	-	631	
1 Passenger Road Transport											
Cases	38	9	13	1	0	0	0	0	0	25	86
$'000	2	5	72	18	-	-	-	-	-		97
2 Freight Road											
Cases	0	1	0	1	0	0	0	0	0	1	3
$'000	-	1	-	18	-	-	-	-	-		19
3 Rail											
Cases											
$'000											
4 Water											
Cases	1	0	0	0	0	0	0	0	0	4	5
$'000	.05	-	-	-	-	-	-	-	-		.05
5 Air											
Cases											
$'000											
6 Heavy Equipment											
Cases											
$'000											
7 Special Vehicles											
Cases	10	3	0	0	0	0	0	0	0	4	17
$'000	.5	2	-	-	-	-	-	-	-		3
8 Other											
Cases	534	20	16	0	1	0	0	0	0	265	836
$'000	27	11	88	-	38	-	-	-	-		164
TOTAL MOBILE PROPERTY											
Cases	1782	100	70	11	5	0	0	0	0	2183	4151
Damage $'000	90	56	386	194	188	-	-	-	-		914

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

Table 3:xiv **Damage to Fixed Property by Fire, April - December 1984 NSWFB Statistics - Misuse Material Ignited Child. 16 & Under**

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY FIXED PROPERTY TYPE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000		
0 Unclassified											
Cases	85	10	5	0	1	0	0	0	0	140	241
$'000	4	6	28	-	38	-	-	-	-		76
1 Public Assembly											
Cases	4	0	2	0	0	0	0	0	0	8	14
$'000	.2	-	11	-	-	-	-	-	-		11
2 Educational											
Cases	6	0	0	0	0	0	0	0	0	4	10
$'000	.3	-	-	-	-	-	-	-	-		.3
3 Institutional											
Cases											
$'000											
4 Residential											
Cases	10	6	5	4	1	2	0	0	0	12	40
$'000	.5	3	28	70	38	300	-	-	-		440
5 Shop/Office											
Cases	5	3	4	0	0	0	0	0	0	0	12
$'000	.25	2	22	-	-	-	-	-	-		24
6 Basic Industry, Utility											
Cases	1	0	0	0	0	0	0	0	0	2	3
$'000	.05	-	-	-	-	-	-	-	-		.05
7 Manufacturing											
Cases	1	0	0	0	0	0	0	0	0	0	1
$'000	.05	-	-	-	-	-	-	-	-		.05
8 Storage Property											
Cases	7	2	5	0	0	0	0	0	0	0	14
$'000	.35	1	28	-	-	-	-	-	-		29
9 Special Property											
Cases											
$'000											
TOTAL FIXED PROPERTY											
Cases	119	21	21	4	2	2	0	0	0	166	335
Damage $'000	57	12	117	70	76	300	-	-	-		580

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

Table 3:xv **Damage to Mobile Property by Fire, April - December 1984 NSWFB Statistics - Misuse Material Ignited Child. 16 & Under**

NUMBER OF INCIDENTS AND ESTIMATED DAMAGE BY MOBILE PROPERTY TYPE AND DAMAGE RANGE

$ Range	0 to 99	100 to 999	1000 to 9999	10000 to 24999	25000 to 49999	50000 to 249999	250000 to 999999	1000000 to 4999999	5000000 and more	Not Rep	TOTAL
Midpoint	$50	$550	$5500	$17500	$37500	$150000	$625000	$3000000	$5000000		
0 Unclassified											
Cases	341	26	15	4	2	2	0	0	0	500	890
$'000	17	14	83	70	75	300	-	-	-		559
1 Passenger Road Transport											
Cases	4	0	4	0	0	0	0	0	0	4	12
$'000	.2	-	22	-	-	-	-	-	-		22
2 Freight Road											
Cases											
$'000											
3 Rail											
Cases											
$'000											
4 Water											
Cases											
$'000											
5 Air											
Cases											
$'000											
6 Heavy Equipment											
Cases	1	0	0	0	0	0	0	0	0	0	1
$'000	.05	-	-	-	-	-	-	-	-		.05
7 Special Vehicles											
Cases	4	0	0	0	0	0	0	0	0	1	5
$'000	.2	-	-	-	-	-	-	-	-		.2
8 Other											
Cases	58	1	3	0	0	0	0	0	0	37	99
$'000	3	1	17	-	-	-	-	-	-		21
TOTAL MOBILE PROPERTY											
Cases	408	27	22	4	2	2	0	0	0	542	1007
Damage $'000	20	15	122	70	75	300	-	-	-		602

*damage estimates have been calculated by multiplying the number of incidents by the midpoint of the damage range

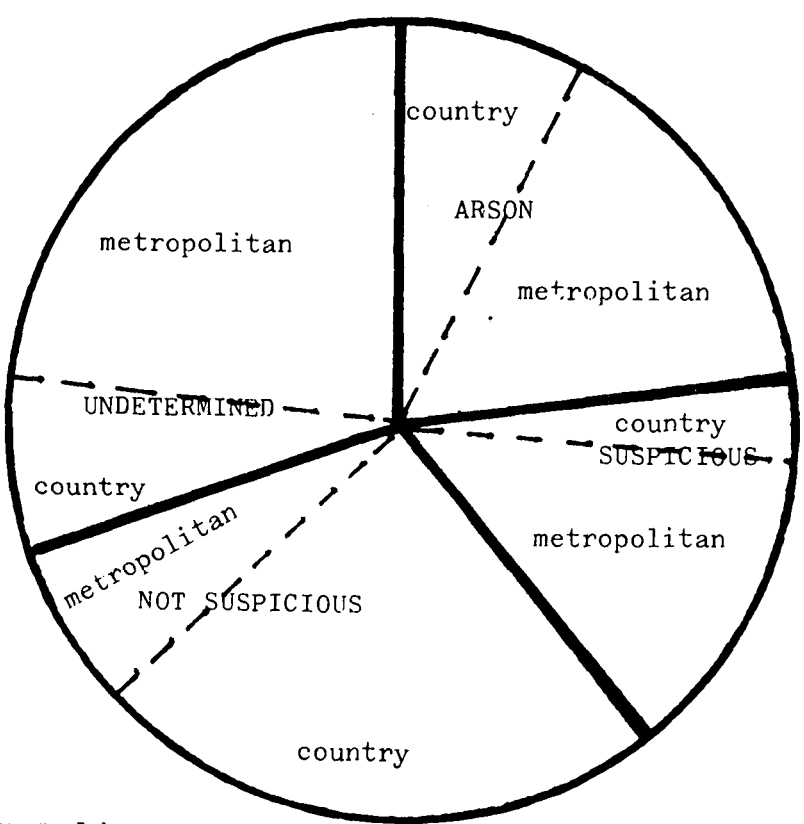
3.3.4 The Pattern of Costs of Arson by Region

Information on the pattern of costs of arson by region is available from Police data. Police data suggests that overall about 62% of fire incidents occur in the metropolitan (Sydney) region and that these account for about 65% of all fire damage reported to police. (The corresponding Fire Brigade figures are 75% and 73% respectively.)

A more detailed breakdown by region is given in Table 3:xvii. The figures represent incidents reported to and accepted by Police as being arson. This suggests that about 74% of arson incidents occur in the metropolitan area.

Deliberately lit fires account for 23% of total damage recorded by Police from fire incidents, and 80% of arson damage occurs within the metropolitan area. Similarly the damage from suspicious fires and fires of undetermined cause is concentrated in the metropolitan region. This pattern is illustrated in Figure 3:iv.

Figure 3:iv The Pattern of Costs of Arson by Metropolitan and Non Metropolitan Regions. 1985/6: NSW Police



Source: NSW Police

Table 3:xvii Arson offences by Police District 1983/84, 1984/85

District	1983/4	1984/85
Albury	15	36
Bathurst	16	23
Dubbo	21	39
Goulburn	30	51
Lismore	28	46
Newcastle	117	186
Parkes	15	29
Tamworth	22	22
Wagga Wagga	13	35
Wollongong	126	169
Subtotal	403	636
Bankstown	133	305
Burwood	209	300
Central	59	97
Chatswood	66	95
Dee Why	130	117
Gosford	58	50
Liverpool	108	183
Maroubra	120	161
Parramatta	127	266
Penrith	102	266
Subtotal	1,112	1,840
TOTAL	1,515	2,476

Source: NSW Police Management Report Summary

3.3.5 A Composite View of the Costs Associated with Arson to Property

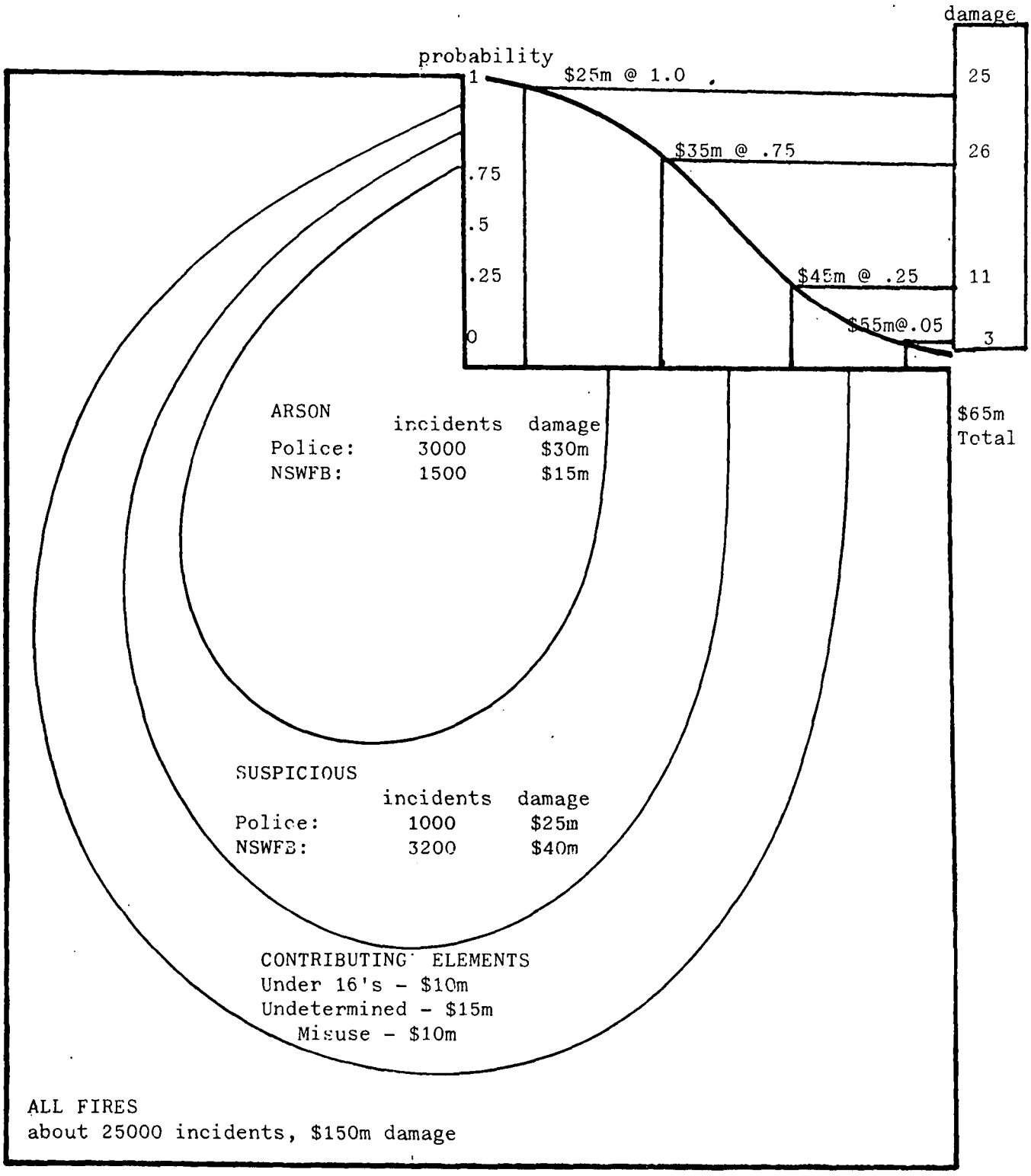
Figure 3:v provides a composite view, built up from the mosaic of information in preceding sections. Overall there are about 25,000 or so fire incidents in NSW each year, and in total these cause about $150 million in estimated damage costs. Estimates of the number of arson incidents and damage vary significantly between Police and Fire Brigades, but a range of 1,500 to 3,000 incidents and $15 million to $30 million damage is reasonable.

A similar discrepancy emerges with suspicious fires, suggesting a spread of between 1,000 and 3,000 incidents and a range of damage between $25 million and $45 million. Finally there are a number of fire incidents which are likely to contain some element of arson and of these there are about 13,500 incidents causing about $35 million in damage.

Not all suspicious fires, nor all fire caused by under 16's may reasonably be attributed to arson, and consequently not all the damage costs associated with such fires can properly be added to the costs of arson. Unfortunately we have no way of knowing what proportion of these fire incidents and damage is actually due to arson, and so any estimate is quite conjectural. For expository purposes we have assumed, in the top right hand corner of Figure 3:v, certain proportions or probabilities. Thus we have assumed that 75% of suspicious fire damage is in fact due to arson, that 25% of "contributing" fires (under 16's and misuse of ignition) is due to arson, and that 5% of all other fire damage is due to hidden arson.

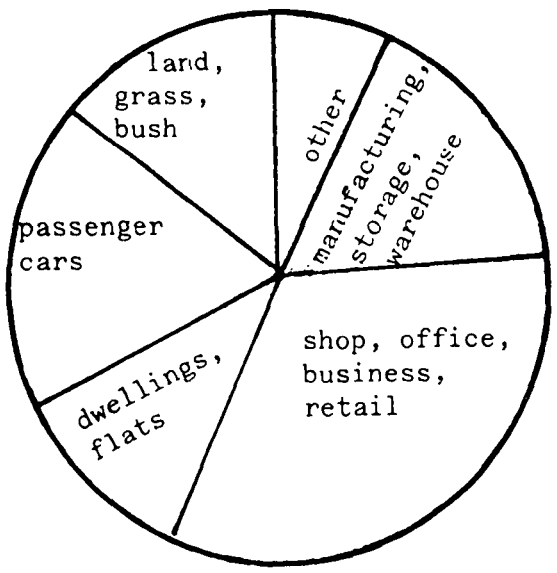
Based on these assumptions and on the limited basic data available, the aggregate figure for arson costs in a given year is in the order of $65 million, or about 40% of the total damage costs associated with fire. Only about $25 million of this can be attributed reliably to arson; estimates of the level of hidden arson costs are conjectural and should be treated with some caution.

Figure 3:v Composite Pattern of Property Damage Associated with Arson



A composite picture of the key areas of damage is depicted in Figure 3:vi (repeated from Figure 3:iii). The main damage areas are commercial property (shops, offices, businesses), domestic dwellings, and passenger cars.

Figure 3:vi Composite Pattern of Property Damage Costs of Arson, by Type of Property



Source: Tables 3:vi and 3:vii

Finally, most damage associated with arson and suspicious fires occurs in the metropolitan area of Sydney; about 80% of the damage due to suspicious and deliberately lit fires is concentrated in the metropolitan area.

3.3.6 The Pattern of Arson Costs by Probable Type of Arson

In section 1.2, six probable causes of arson were identified:

1. pyromania and vandalism
2. concealment
3. fraudulent liquidation
4. subversive destruction
5. contributory negligence
6. terrorism

There is no information readily available which relates damage costs to the probable cause of arson, and any attempts to do so must be treated with the utmost caution. However, the general pattern that emerges in the preceding section suggests that most arson costs are associated with the destruction of commercial premises or with private possessions (cars, dwellings). The destruction of public property such as schools, which often catches media attention, is not large when seen in context.

It would therefore appear that the great bulk of arson costs are incurred as a result of fraudulent liquidation, concealment and subversive destruction. This is not to say that arson without a commercial motive (pyromania, vandalism, terrorism and contributory negligence) is not significant; a large number of arson incidents are, for example, created by under 16's and such incidents tie up emergency services. However, the damage costs associated with non-commercial arson appear to be relatively small in proportion to the total.

4. THE PATTERN OF DEATH AND INJURY ASSOCIATED WITH ARSON

There are about 60 deaths and 250 to 350 injuries associated with fire in NSW each year. Tables 4:i and 4:ii provide a summary of the pattern of death and injury for the years 1978 to 1980, and for 1984 (April-December only) respectively.

Arson, and suspicious circumstances cause about 2 to 10 deaths each year, or about 10% of the total deaths due to fire. Similarly, arson and suspicious circumstances lead to between 7 and 14 non-fatal injuries each year, or about 4% of total injuries due to fire. No information is readily available as to the severity of these injuries.

Attaching monetary values to life and limb is always a contentious process. Any estimate of the monetary costs associated with arson deaths and injuries is entirely contingent upon the assumed value of life. For example, if a figure of $1 million (roughly in line with some personal injury awards) is assumed, the total damage costs of arson deaths is in the order of $5 million per annum.

As indicated in tables 4:i and 4:ii, arson is not a major source of deaths or injury in either relative or absolute terms, and although any loss of life or of capacity is a cause for concern, the costs associated with this aspect of arson appear to be relatively minor in the overall context of property damage from arson.

Table 4:i Fatal and Non Fatal Injuries Due to fire by Cause of Fire 1978-1980

Cause of Fire	1978		1979		1980	
	Fatal	Non Fatal	Fatal	Non Fatal	Fatal	Non Fatal
Incendiarism or suspicious circumstances	3	7	2	9	4	10
Match, cigarette or firework	14	49	9	64	14	70
Controlled fire in the open	-	3	-	3	-	6
Room or space heating appliance	4	20	3	19	1	20
Cooking or food warming appliance	-	44	2	50	3	67
Other appliance for heat production	-	4	3	4	-	5
Tool, equipment or appliance, n.e.c.	1	11	-	18	1	13
Domestic appliance, n.e.c.	-	12	-	17	1	16
Electricity supply equipment	1	9	3	11	3	19
Transport, crash or collision	12	21	17	23	12	20
Transport, other	1	25	2	27	-	25
Flammable or other hot substance	-	16	-	13	1	18
Other or unknown	17	48	15	44	17	60
Total Fires Involving casualties	53	269	56	302	57	349

Note: Excludes NSW Fire Brigade Personnel

Source: Fire Statistics NSW 1980 p43

Table 4:ii Injuries and Fatalities Due to Fire
April-December 1984

	INJURIES		FATALATIES	
	N	%	N	%
INCENDIARY	2	1	5	8
SUSPICIOUS	12	5.4	5+	8
MISUSE OF IGNITION	72	32.6	22+	35
of which children 16 under	(18)	(8.1)	(11+)	(17.7)
MISUSE MATERIAL	27	12.2	1	1.6
UNDETERMINED	8	3.6	1	1.6
OTHER	100	45.2	28	45.8
TOTAL	221+	100	62+	100

Source: NSW Fire Brigade

5. AREAS FOR FURTHER RESEARCH AND ACTION

5.1 Introduction

The main focus of this study has been to use available information to describe the significant features of the pattern of arson in NSW. The scope of the study has necessarily been limited by the availability and compatibility of information relevant to arson.

The study has clearly demonstrated that arson is a significant and an increasing problem. It has also been shown that the pattern of costs associated with arson is a complex one which does not necessarily fit with some of the conventional stereotypes.

From a broad economic and social perspective, arson constitutes an important phenomenon for three reasons.

First, unlike most commercially oriented crime (such as burglary, white collar fraud), arson requires the destruction of private and community resources as an essential prerequisite to its success. Arson generally relies upon insurance pay-out on the property or person as a means of gain for the arsonist, and insurance payment will not be made unless property or life is lost. A white collar criminal or a burglar may destroy some property or even life in order to obtain some personal gain, but this is not essential to the gain. Arson is thus a peculiar waste of the community's resources.

Second, arson tends to destroy evidence and is thus difficult to prosecute successfully. From an economic viewpoint, the incidence of crime is related inversely to the probability of incurring a penalty and the size of the penalty. Evidence indicates that the probability of being caught and successfully prosecuted for arson is negligible, and it is not surprising that, as a commercial venture, arson is on the increase.

Third, despite the apparent size, growth and dimensions of the problem, there is no existing organisational structure available to deal with and manage the resources in a coordinated fashion. Consequently, little progress has been made in directing and coordinating resources to areas where they are most likely to be effective in combating arson. This should not be seen as

denigrating the very considerable efforts of a range of people from the various areas concerned, such as Police, Fire Brigade and insurance companies. It is simply to say that arson in NSW involves around $65 million a year in direct costs, without taking into account a number of indirect costs. To manage and control an industry of this size requires more information, management skills and resources than is currently available.

There are three areas where we believe that there is significant potential for improvement in the way the arson problem is managed, and which thus justify additional research and feasibility assessment. These are dealt with below.

5.2 Areas for Further Research and Feasibility Assessment

5.2.1 Data Collection and Compilation

It is impossible to effectively manage and control resources in combating arson in the absence of adequate information.

Although there have been very significant improvements in the quality and extent of information collection and compilation over the last two years, there is still room for improvement. Such improvements, we believe, have the potential to be quite cost effective.

Some examples which warrant further assessment are:

- Simplification of some of the extraordinarily complex aspects of the SAA method of collection for Australian Fire Brigades, so as to improve the reliability of data and reduce mistakes.

- Rationalisation and clarification of some aspects of the SAA categorisation, particularly in respect of the overlap of complex, mobile and fixed property categories.

- Better coordination between the categorisation systems of Police and Fire Brigade, including attention to greater compatibility of categorisation by cause, region and type of incident.

- Development of a comprehensive and systematic data collection system amongst insurance companies.

- Investigation of a database system which links Police, Fire Brigade, insurance industry and another relevant data. Such a system would need to be more general than just arson application, but might allow more effective case searches. Some serious privacy issues are involved in the development of any such system and it would also be necessary to consider Arson reporting immunity legislation.

5.2.2 Further Investigation on the Pattern of Costs

The current study has concentrated on using available information from Police and Fire Brigade sources to describe the broad pattern of arson. In Section 1.6 it was noted that the main dimensions of the pattern of costs of arson are:

- infrastructure,
- construction,
- insurance premium,
- investigation, extinquishing,
- insurance pay out,
- disruption, and
- replacement costs.

This study has mainly addressed the last of these, i.e. replacement costs.

It is possible to obtain information on most of the other dimensions. However, such information is not readily available, and is thus more expensive to obtain. For example, the only way of obtaining information on insurance pay-outs is to undertake a detailed survey of insurance companies. The insurance industry does not usually acknowledge that it pays out anything on arson, and to access relevant data would require a fairly complex sampling survey approach. Similarly, the clean up costs (extinquishing and infrastructural costs) associated with arson can be approximated, but again this would require extensive contact with a range of public and commercial organisations.

Nevertheless, control of these costs and the extent of them, is an important aspect of the effective management of resources to combat arson. This is particularly true of

- High cost areas: where arson imposes very significant costs. As noted in Sections 2.2.1 and 3.3.2 most damage

from fires and arson is concentrated in relatively few fire incidents,

- Hidden cost areas: where the real costs of arson tend to be disguised because they are not readily translatable into money terms (such as destruction of native flora, fauna and lands, costs associated with inconvenience and disruption, and the social costs of disfigurement of victims,etc.) or because existing accounting systems do not apportion the costs in an identifiable way (such as the cost of local councils and fire brigade cleaning up and removing debris, and the standby costs of emergency services attending unnecessary calls).

5.2.3 The Development of Strategies for Combating Arson

There is a range of strategies available which may be effective at discouraging arson. Arson is a complex phenomenon, and some strategies may be more cost effective than others at reducing some types of arson. To effectively manage the resources available for dealing with arson requires a broad and comprehensive perspective. Some examples may give an indication of the possible directions of investigation:

- Arson of commercial premises is a major component of the replacement costs associated with arson. Better information and access to advice for small businesses may be an effective way of reducing the costs in this area. That is to say a more pro-active approach, that goes beyond the existing axis of Police, Fire Brigade and insurance industry, may be worth investigating.

- It is extremely difficult to prosecute successfully for arson. As a consequence, the practice appears to have evolved where prosecution for other crimes (malicious damage, fraud, conspiracy, etc) is usually pursued. Similarly, the insurance industry tends to run a war of attrition with claimants suspected of arson, rather than accusing them of arson outright. This clearly raises the question of whether a systematic review of the economic-criminological aspects of arson may offer a more rational and effective line of prosecution and penalty.

- Most arson is reported in the press in semi-sensational, disassociated fashion. The success of the Neighbourhood Watch and similar overseas schemes in changing the public perception of crime, their responsibility towards it, and the probability of being apprehended may well warrant some further investigation.

- The need for better organisational structures to allow for effective detailed investigation of the specific criminological aspects and patterns of arson (e.g. coordinated task forces with expert knowledge and advice in the same style as industrial, air and road safety investigation teams).