1991

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Institute of Security and Applied Technology

AN ANALYSIS OF THE MONITORED ELECTRONIC ALARM ACTIVATIONS IN THE PERTH METROPOLITAN AREA

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September 1991
ISBN 0-7298-0110-1

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Lynette M Bloom, James M Cross and David McDougall
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Introduction

This study as indicated in [7] was carried out under the auspices of Edith Cowan University's Institute of Security and Applied Technology and had the support of the Western Australian Police and the Perth-based Central Monitoring Agencies. The data analysed was obtained essentially from Police records, backed up by data from two of Perth's larger security companies, and consists of all the monitored alarms in the Perth Metropolitan Area which were attended by the police in the months of May and September 1989.In our consideration of the frequency of alarms by time of day and day of week, and the frequency of false alarm per activated system we have analysed both the May and the September data. However, we look at the cause of the alarm for the September data only. The reason for this is that, from September 1989 onwards, largely as a part of their cooperation in this project, the WA Police have been recording more detailed "on the spot" information than previously.

We look here at the false alarm rate, in total, and separately for intruder-detection (break-in) and duress (hold-up) alarms. In this context we follow standard convention and consider a false alarm to be the activation of an alarm system where no offence could be recorded. Thus, it is an activation through mechanical failure, system malfunction, improper installaton or use, the negligence of the proprietor of the property covered or by his/her employees or agents or other factors beyond the control of the alarm users.

Previous studies, in Perth and elsewhere,(see [1]-[6]) indicate a very high incidence of false alarms and this poses a serious problem for the police. We found that the false alarm rate in Perth in the months of May and September 1989 averaged 93.2% ‹May 92.8%; September 93.6%›. The total number of police callouts resulting from false alarms more than trebled in the period from June 1984 to September 1989, rising from 776 in the 30 day period 23 June - 22 July 1984 (see [5]) to 2,640 for the month of September 1989. This is placing undue pressure on scarce police resources, and must be funded by the community. In some places, including South Australia and New South Wales, the police have levied an attendance fee on the the proprietor of an alarm system where there is repeated false activation. A similar scheme is under consideration in Western Australia.

The suggestion is clearly that owners need to accept a higher degree of responsibility for the correct use and regular maintenance of their systems, and that this would result in a lower incidence of false alarms.

Hourly Frequencies: Variation with Time of Day

The graphs in Figure 1 depict the average number of false and genuine intruder-detection alarms that occurred at the various times of the day for May and September. For both types of activation, these figures are highest between 9 pm and 4 am. In the case of the false alarms, each month shows a clear local peak between 6 am and 8 am and between 6 pm and 7 pm, corresponding to the normal hours of opening and closing (as in [2]) . The correlation between the false alarm figures for these two months is 0.94, and that for the genuine alarm figures is 0.95 indicating that this result is representative of the general situation.

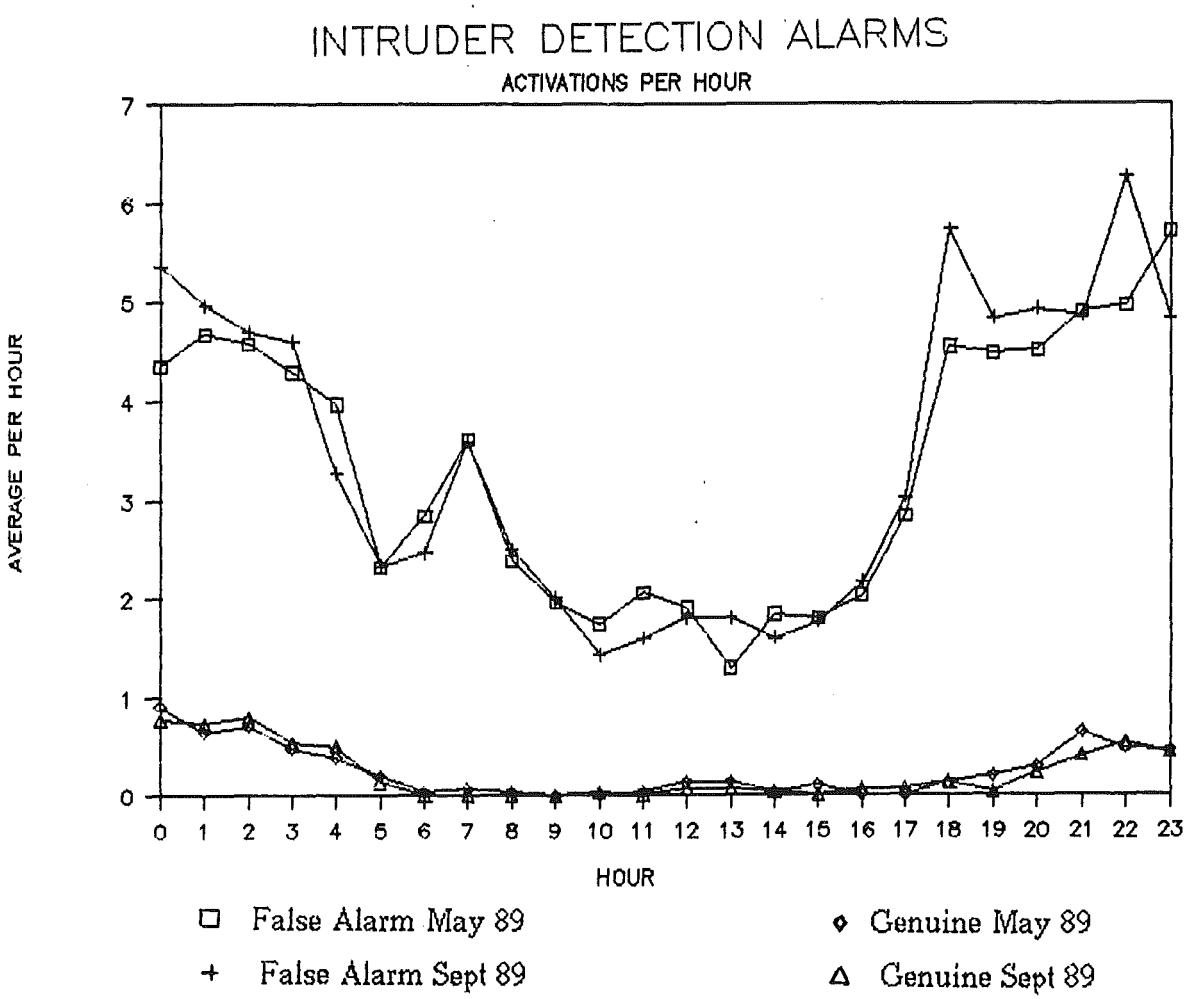

FIGURE 1

The graphs in Figure 2 depict the average number of false and genuine duress alarms that occurred at the various times of the day for May and September. The numbers for the genuine duress alarms are relatively constant throughout the day. For the false duress alarms the overall indication is that these are high between 8 am and 5 pm, which are the normal working hours in financial institutions. The correlation between the false alarm figures for these two months is 0.61, and that for the genuine alarm figures is 0.09. The low correlation for genuine alarms is a consequence of the low frequency of hold-ups per hour, with no discernable pattern in the frequency over the day.

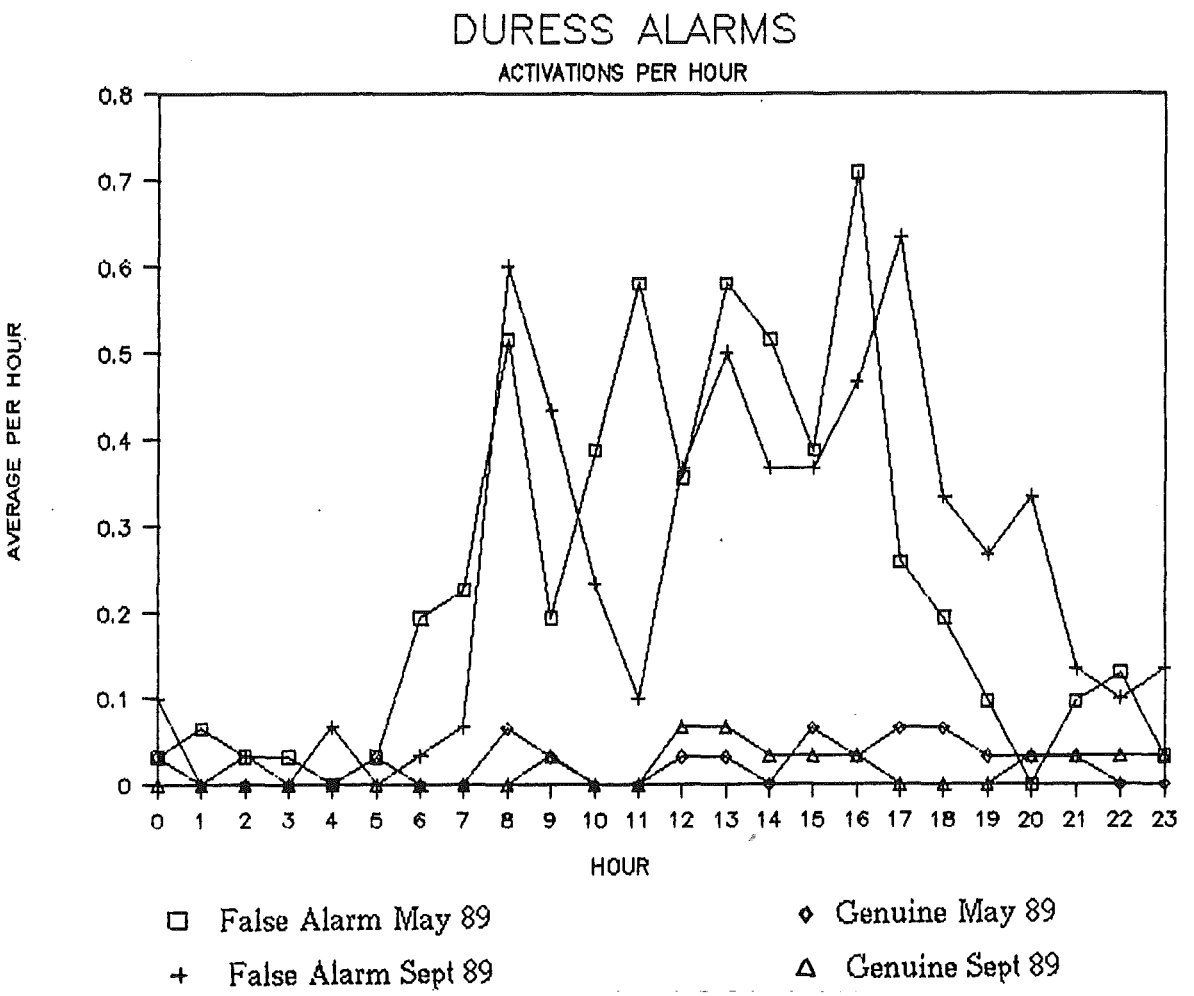

FIGURE 2

The graphs in Figure 3 depict the average number of genuine activations that occurred at the various times of the day for May and September. For each month these are highest between 9 pm and 3 am. The correlation between the figures for these two months is 0.93. The indication here is that the police should accord activations between these hours a higher priority than at other times.

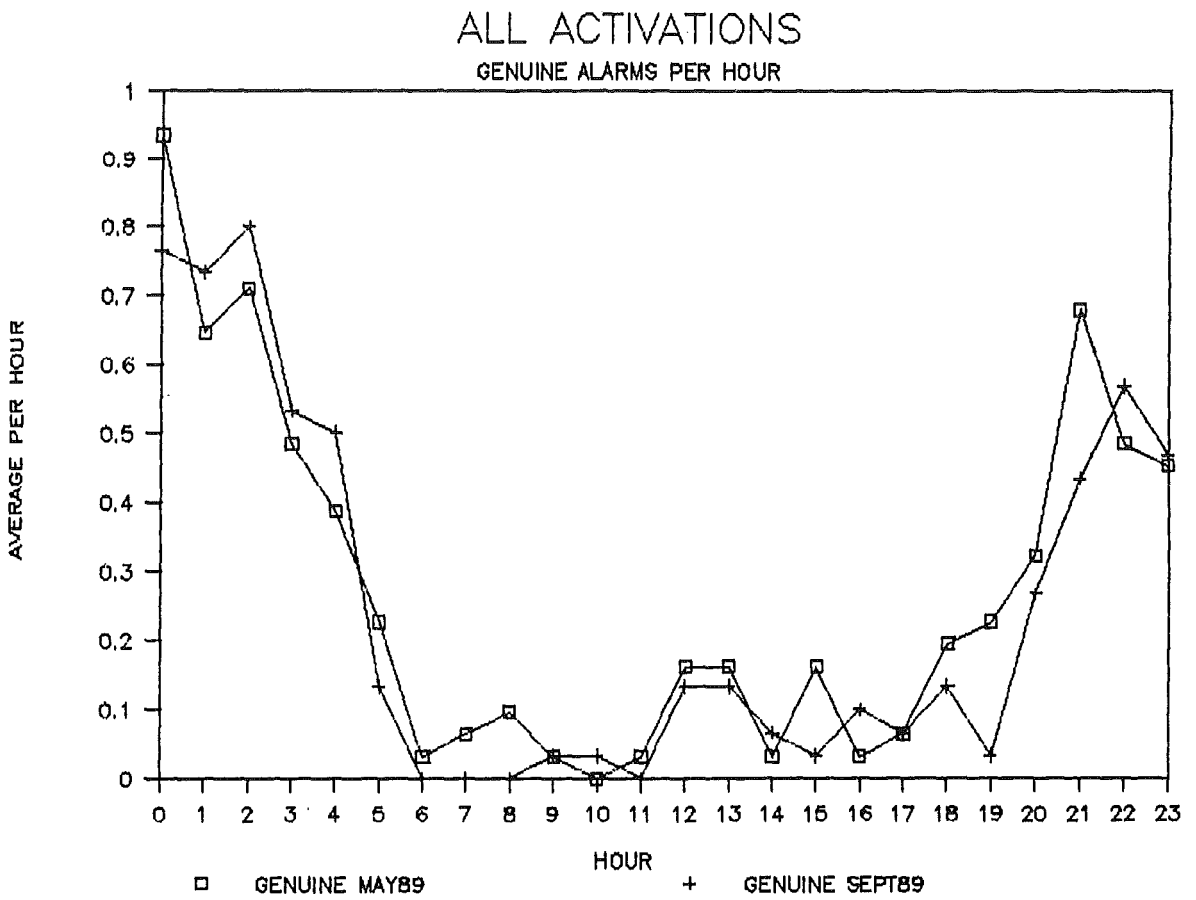

FIGURE 3

The graphs in Figure 4 depict, for the months of May and September 1989, the average hourly percentage of intruder-detection alarm activations that are genuine. Notice that the percentage is particularly high between midnight and 4 am. For this period the percentage of genuine alarms is greater than 10% for both months. Between 6am and noon and between 2pm and 7pm the percentage of genuine alarms is less than 5% for both months indicating a much greater likelihood of false alarms. The indication here is that the police should accord intruder-detection activations between midnight and 4am a higher priority than at other times.

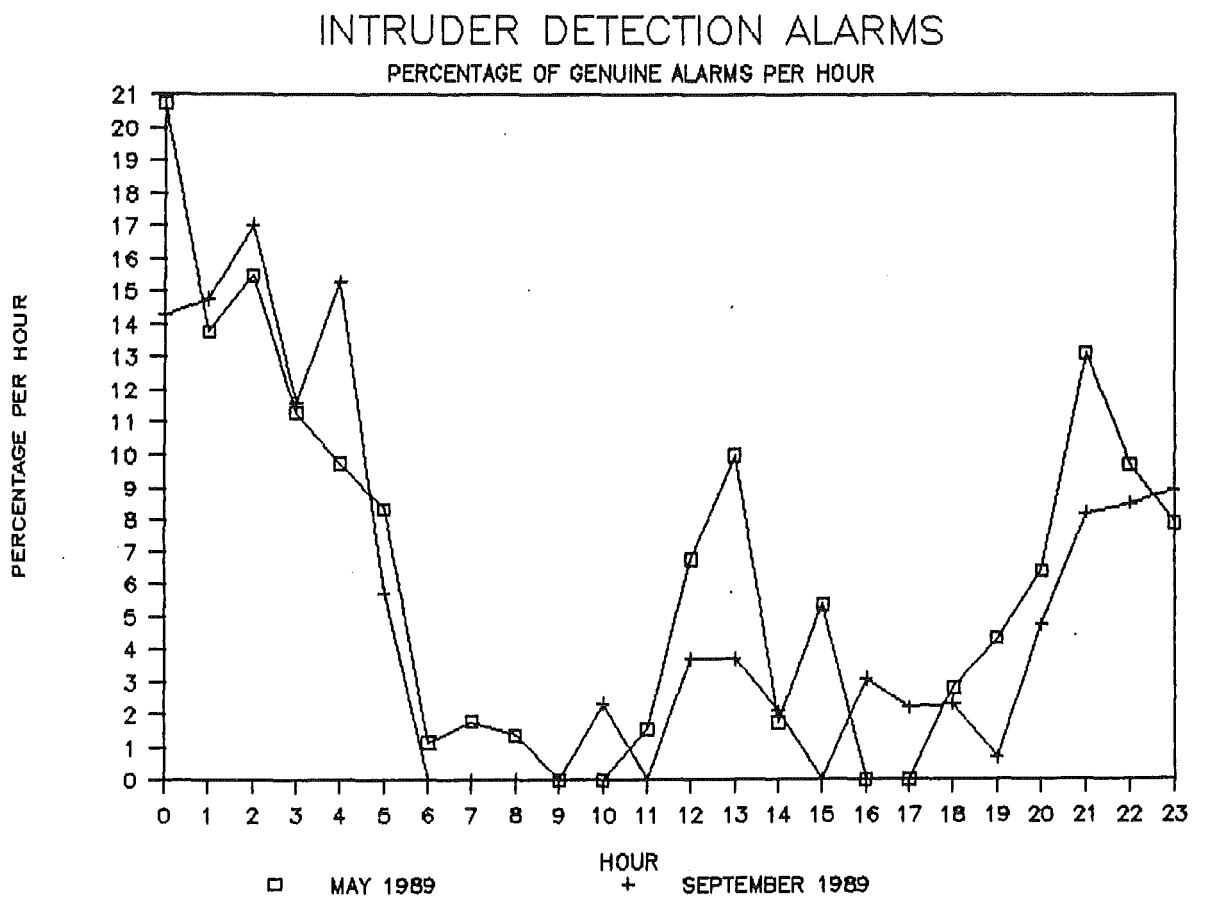

FIGURE 4

Daily Frequencies: Variation with Day of the Week

The graphs in Figure 5 depict the percentage of false intruder-detection alarms that occurred on the various days of the week for May and September 1989. The correlation between the figures for these two months is 0.95, and it is clear that the greatest percentage of false alarms occurs at weekends.

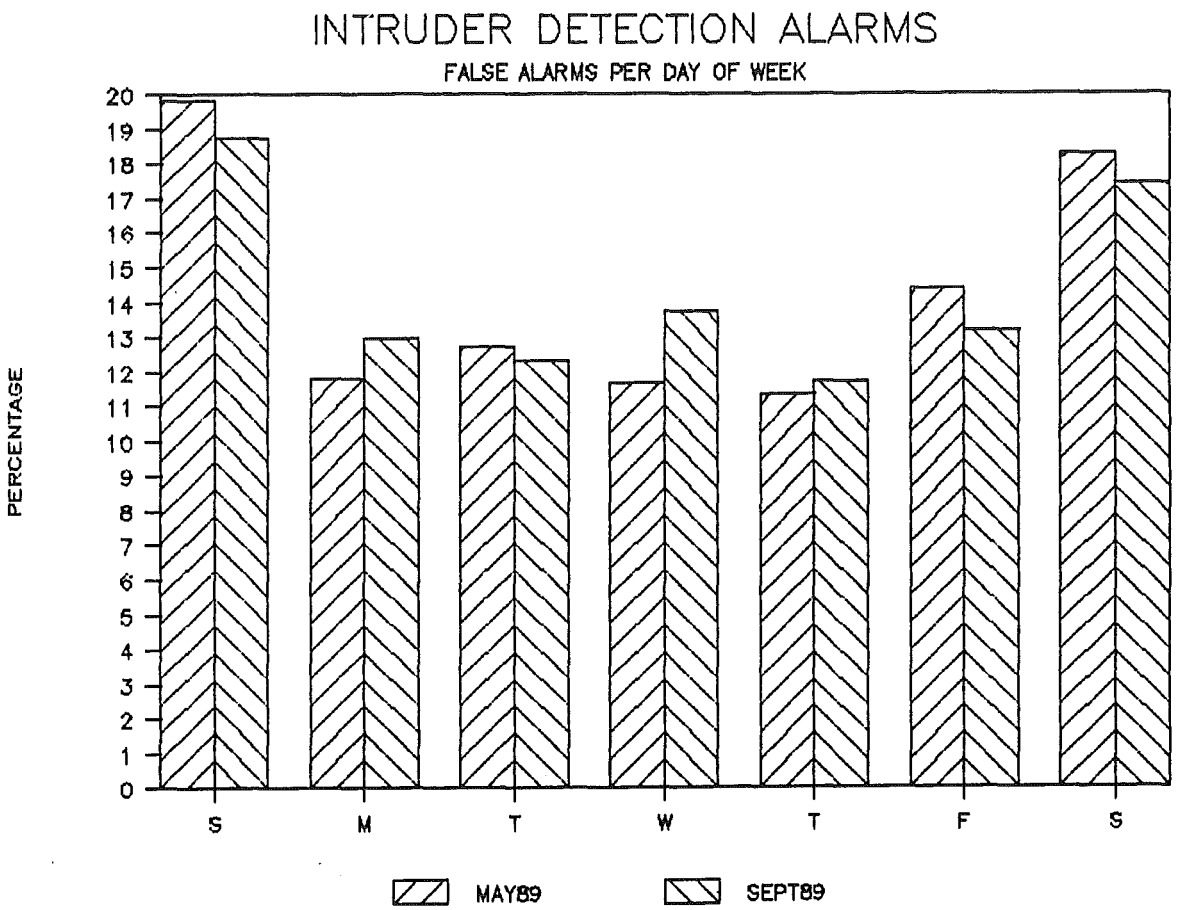

FIGURE 5

The graphs in Figure 6 depict the percentage of false duress alarms that occurred on the various days of the week for May and September. 1989. The correlation between the figures for these two months is 0.78, and it is clear that the greatest percentage of false duress alarms occured during the working week, prompting the suggestion (which is, as we shall see later, confirmed by the figures) that the great majority of these are due to client error - perhaps by accidentally pushing a button that, by its very nature, must be easy to activate.

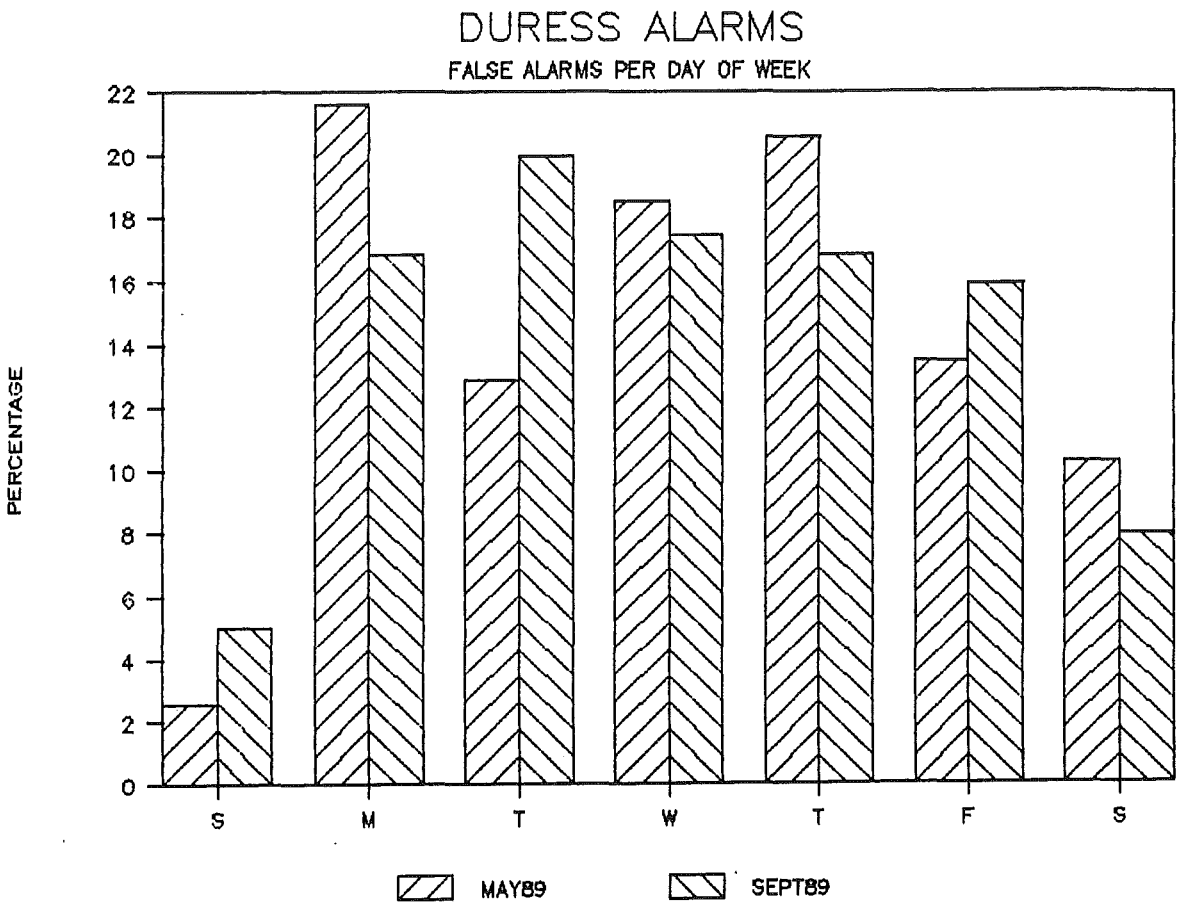

FIGURE 6

The graphs in Figure 7 depict the percentage of genuine activations that occurred on the various days of the week for May and September. Unlike the result for the Victorian Survey (see [6]), no clear trend is revealed here. In fact, the correlation between the figures for these two months is low (r = 0.32). It would appear that the day of the week on its own does not play an important role in deciding the liklihood of an alarm being genuine.

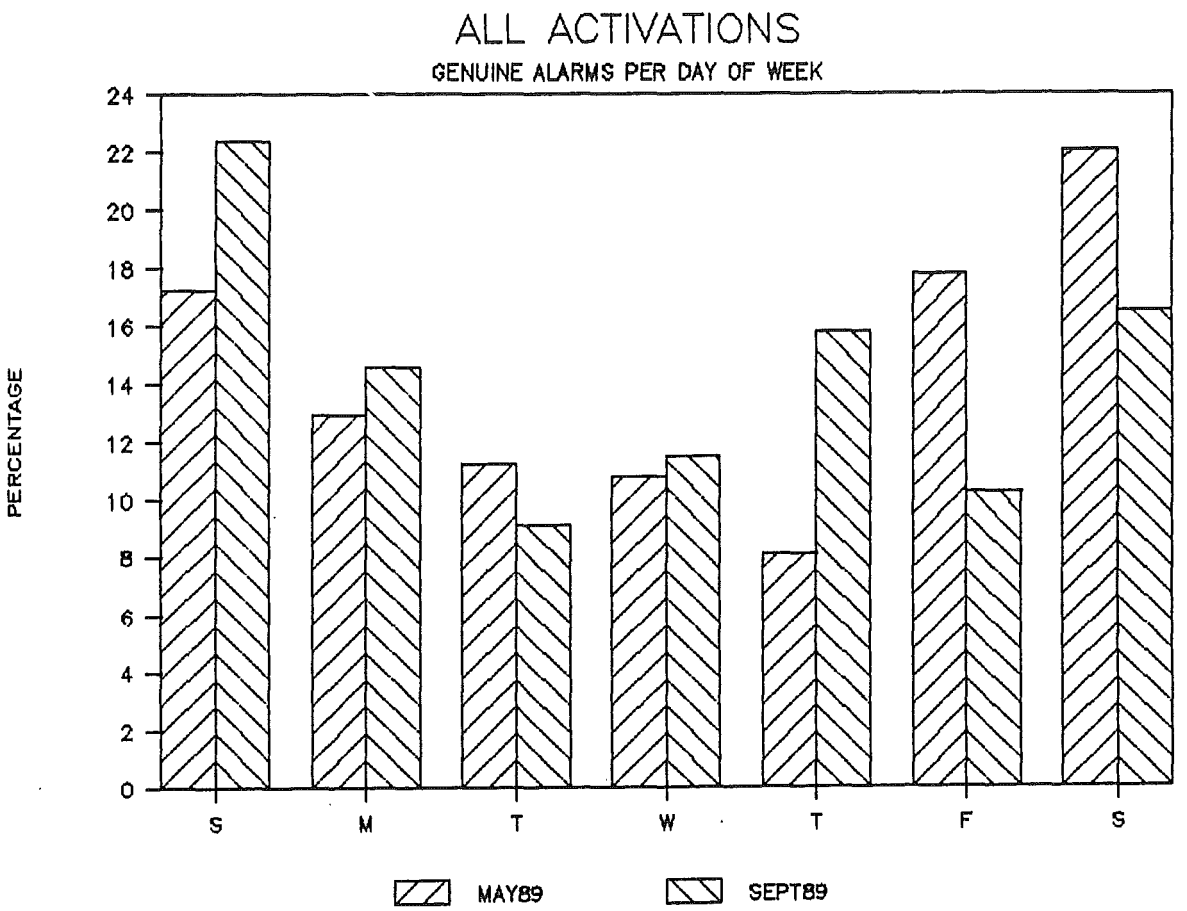

FIGURE 7

Cause of Activation

We consider now the cause of the activations for the September 1989 data. These have been broken down into the categories Genuine Intrusion, Genuine Holdup, False due to client (including cleaners), False due to equipment malfunction, False due to line failure, False due to other known cause, and False due to unknown cause. The results obtained are summarised by the Pie Graph in Figure 8.

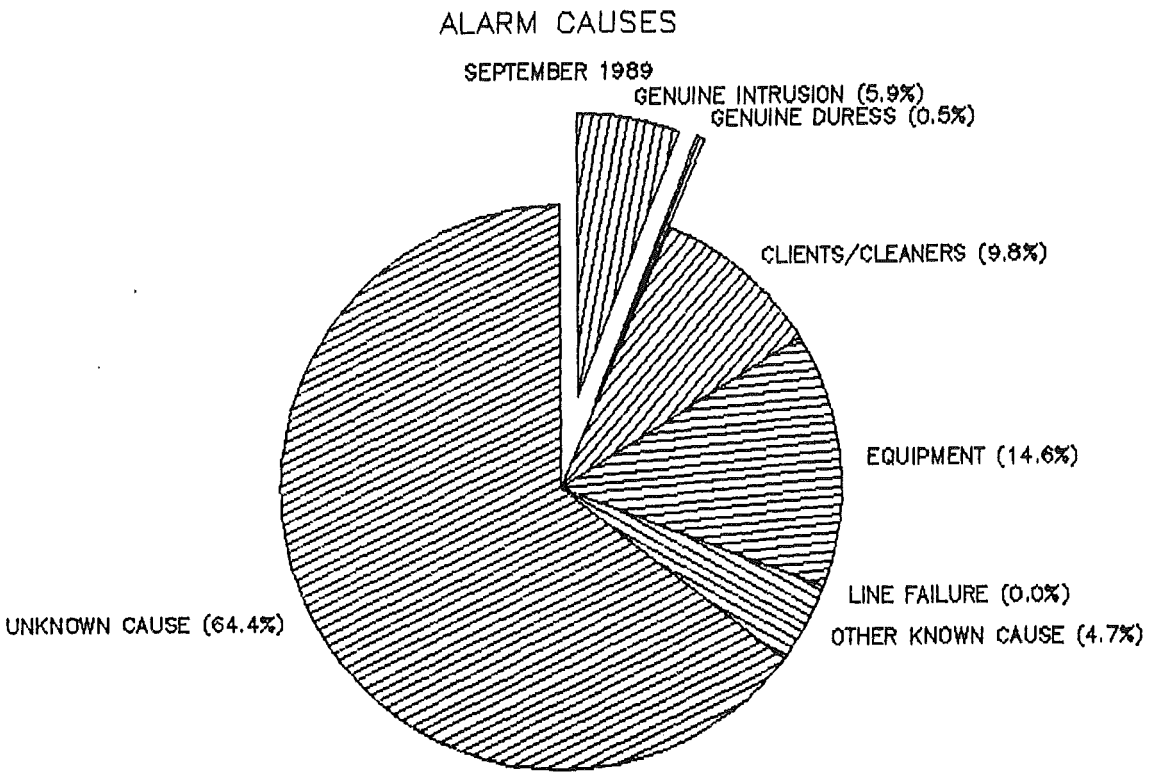

FIGURE 8

Thus, 6.4% of all activations were genuine, giving a false alarm rate in September 1989 of 93.6%. This compares well with the WA result (see [5]) of 94.5% for June/July 1984, and is comparable with the Victorian result of 96.8% (see [6]). It is interesting to note that, in contrast to the figure of 4% in Britain [3] and 1.7% in Victoria [6], the percentage of false alarms due to Line Failure is virtually non-existent in Perth. The Other Known Causes category contains such interesting causes as

* wind blowing curtain
* cat loose inside
* large butterfly
* mouse in system
* vibrations from lawn mower
* stock fell off shelf
* burnt toast
* movement of fish
* insects
* pigeons on roof

The data was regrouped into the four categories of Genuine, False due to client, False due to equipment malfunction, False due to other known cause, and False due to known cause. These results are summarised in total and by reporting agency, for all activations in Figure 9 and separately for intrusion detection and duress alarms in Figure 10 and Figure 11 respectively. It is worth mentioning here that the reporting agency 1 is the General Public and that only six of the seven secutity firms involved handled both intrusion detection and duress alarms. Note that, while only 9.8% of all activations were false alarms attributable to the client, 35.0% of all duress alarms were due to client error. This figure is as high as 44.4% from one reporting agency. This situation was alluded to earlier and would indicate that a training process should be introduced to educate clients in the correct use of these alarm systems. Note also that 69.2% of all duress alarms reported by the general public were genuine. This probably reflects the fact that the general public tend to report a hold-up when it is actually in progress.

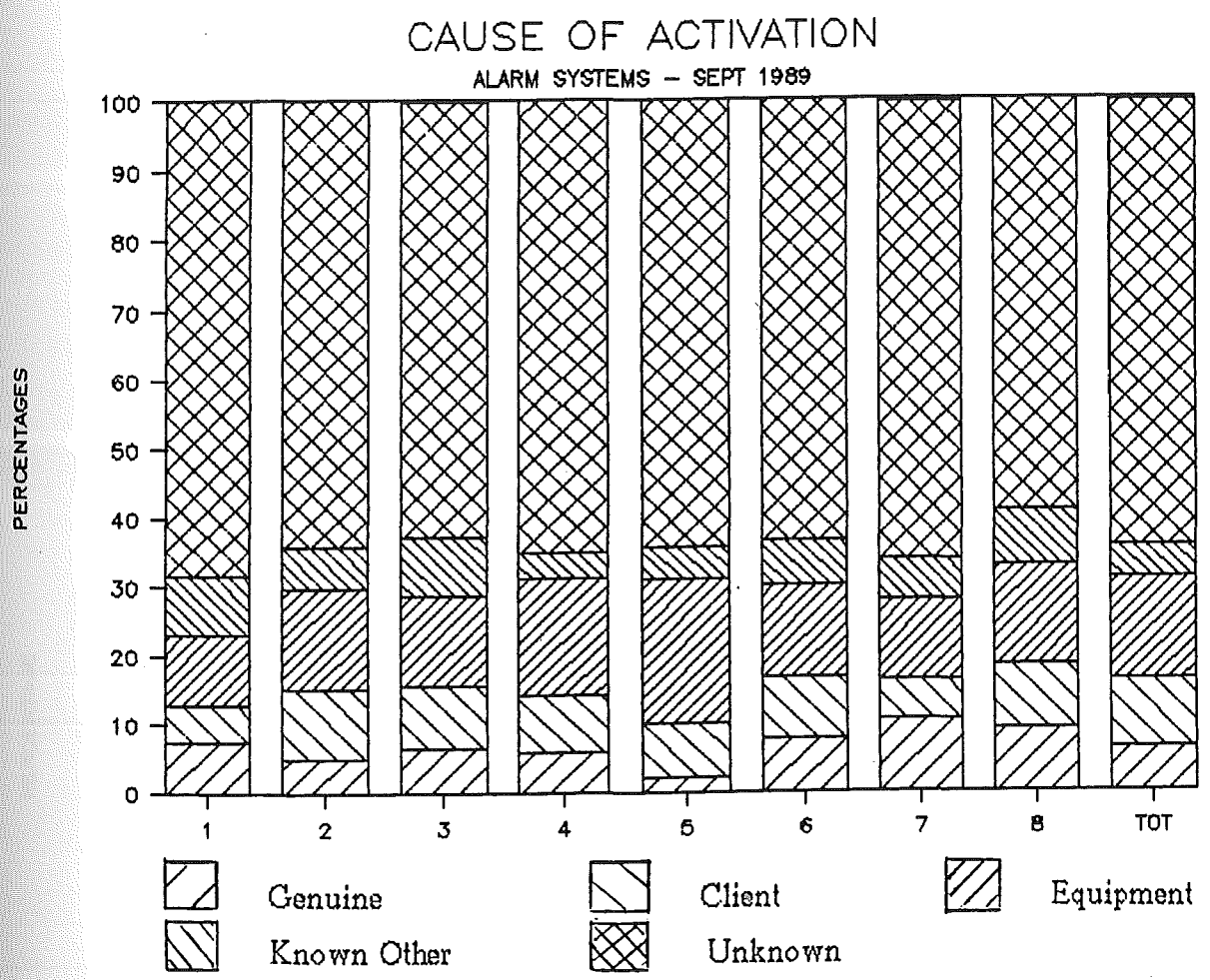

FIGURE 9

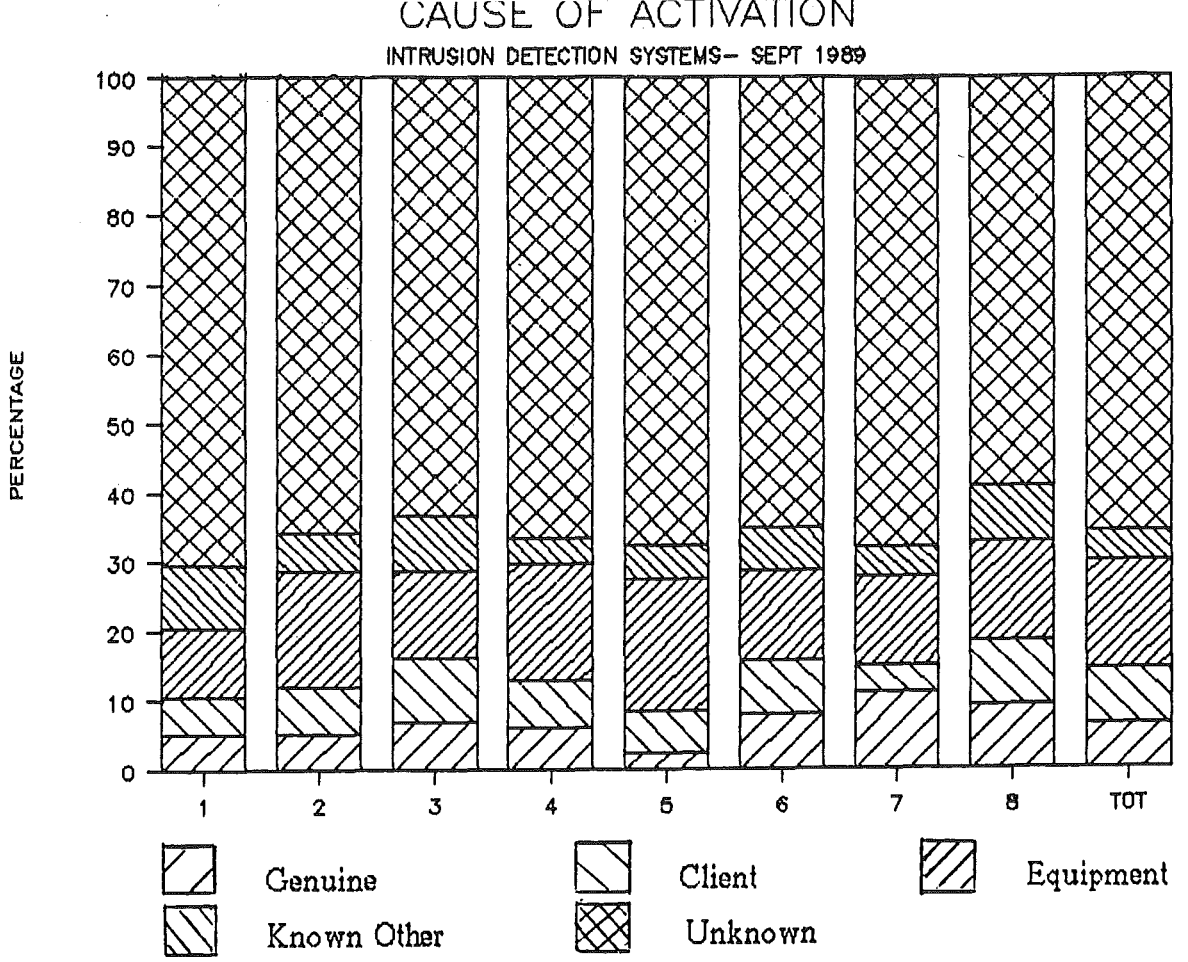

FIGURE 10

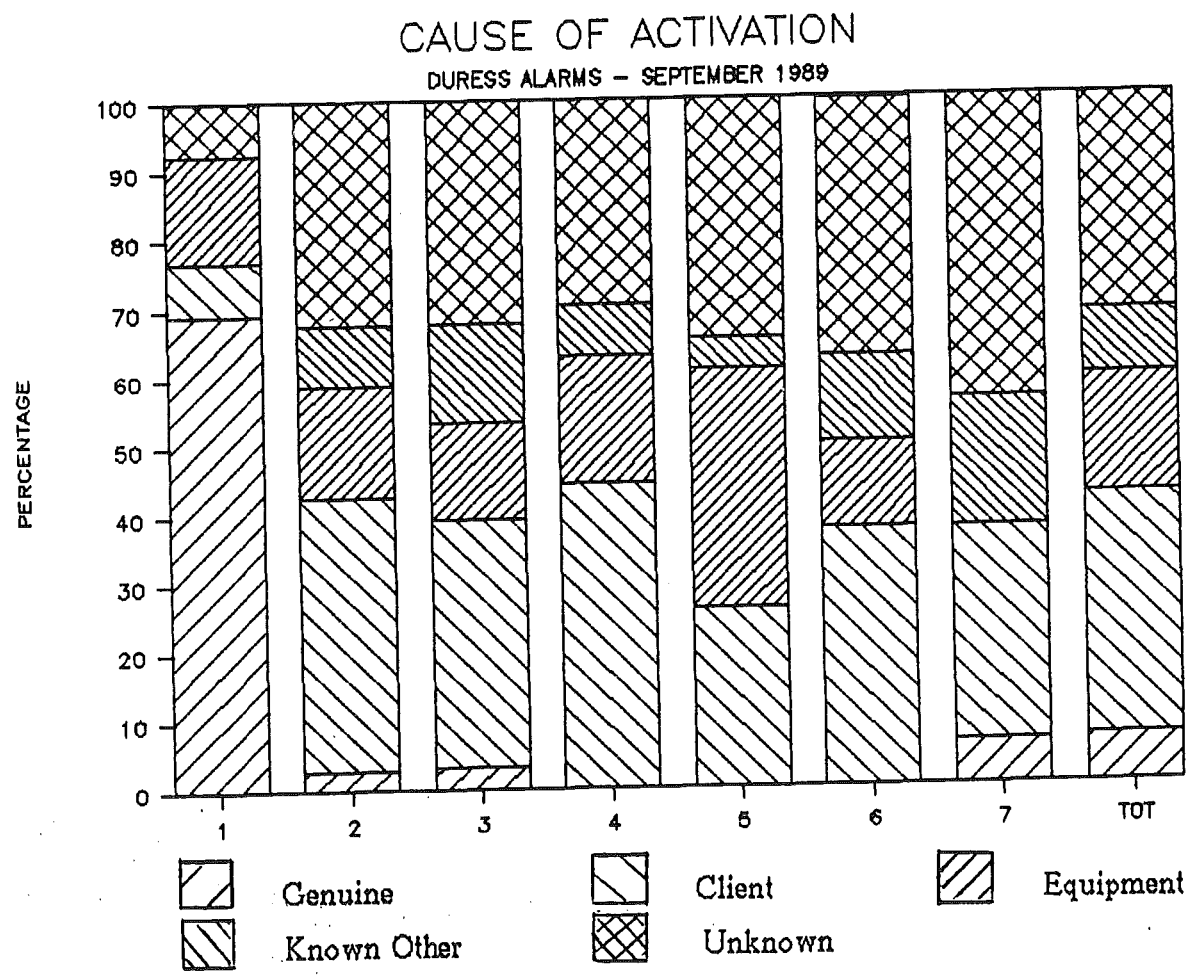

FIGURE 11

The percentage of alarms with unknown causes in September was 64.4%. This is high when compared with 49.28% obtained in the Victorian study (see [6]). Data obtained from two of Perth's larger security companies for May 1989 resulted in only slight improvement on the percentage of unknown causes. It is clearly important that in order to reduce false activations central monitoring stations be encouraged to determine the probable cause of the activation and maintain records of such causes.

One factor that is frequently thought to cause activations is strong wind and storm activity. However, less than 2% of activations could be directly linked to the weather. In the Victorian study (see [6]) 2.5% of activations were known to be the result of the weather. Of interest, therefore, is the large percentage of unknown causes and the possible link with the weather.

The hourly wind strength and direction for Perth was obtained from the Bureau of Meteorology for the months of May and September. A study of the maximum gust, greatest hourly speed and total number of knots per day for May and September failed to show any definite connection with the incidence of false alarms.

In addition to an analysis of the total activations a comparison can be made between central monitoring stations and the public. Of particular interest is the percentage of genuine activations for each station. This data is summarised in Table 1 below.

PERCENTAGE OF GENUINE ACTIVATIONS

	1	2	3	4	5	6	7	8	TOTAL
MAY	8.5	3.6	4.5	6.2	7.5	5.6	13.2	30.0	7.2
SEPTEMBER	7.5	5.0	6.5	5.8	2.2	7.8	10.5	9.2	6.4

Table 1

While there is considerable variation between companies for a given month the correlation between the months is only 0.42 indicating the need for central stations to regularly monitor their false alarm rates. For those stations with genuine activations consistently less than 6%, action should be taken to improve the percentage by educating clients in the correct usage of the system and by increasing their maintenance programme.

Type of Premises

The premises where activations occured were classified into commercial, financial, residential and government. The results for intruder detection and duress alarms for May and September are summarised by the Pie charts in figures 12-19.

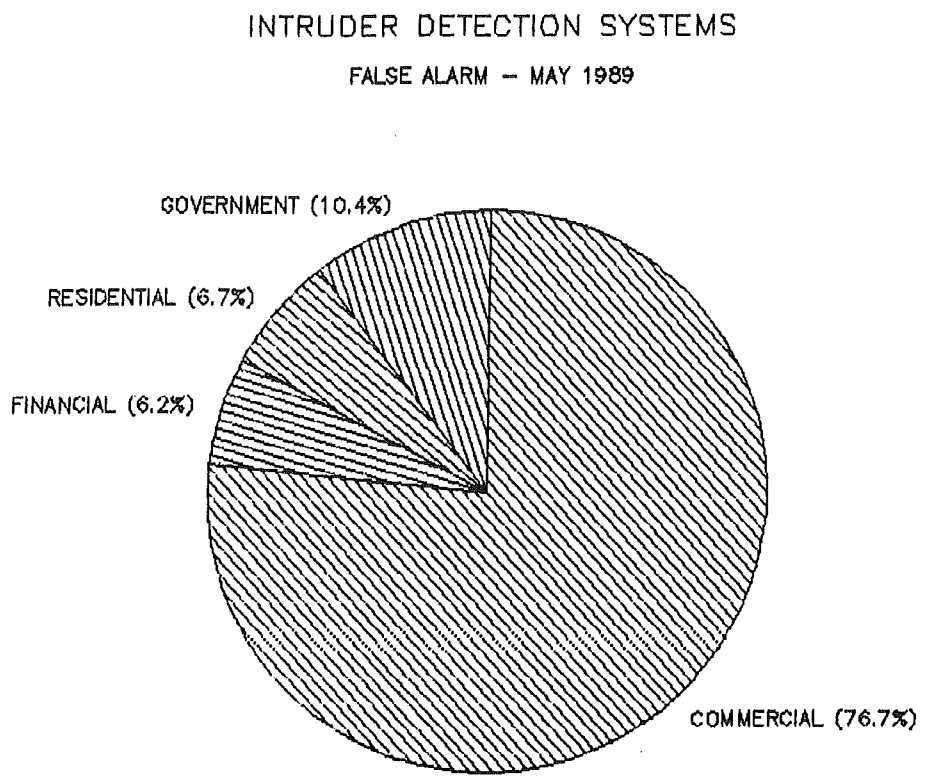

Figure 12

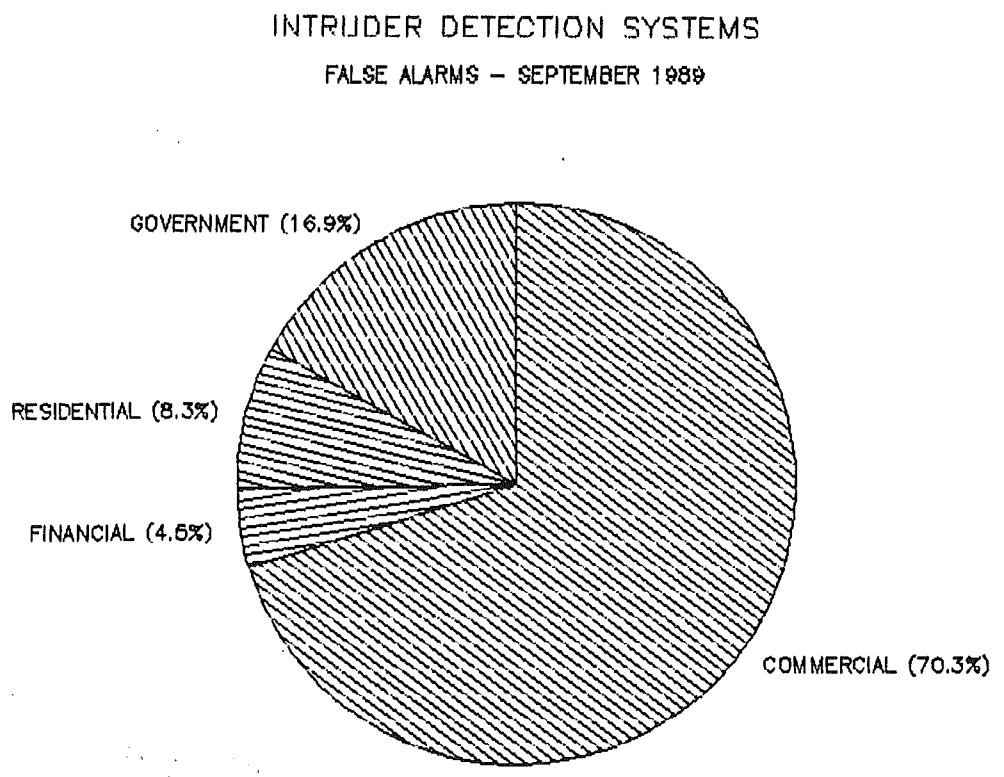

Figure 13

INTRUDER DETECTION SYSTEMS

GENUINE – MAY 1989

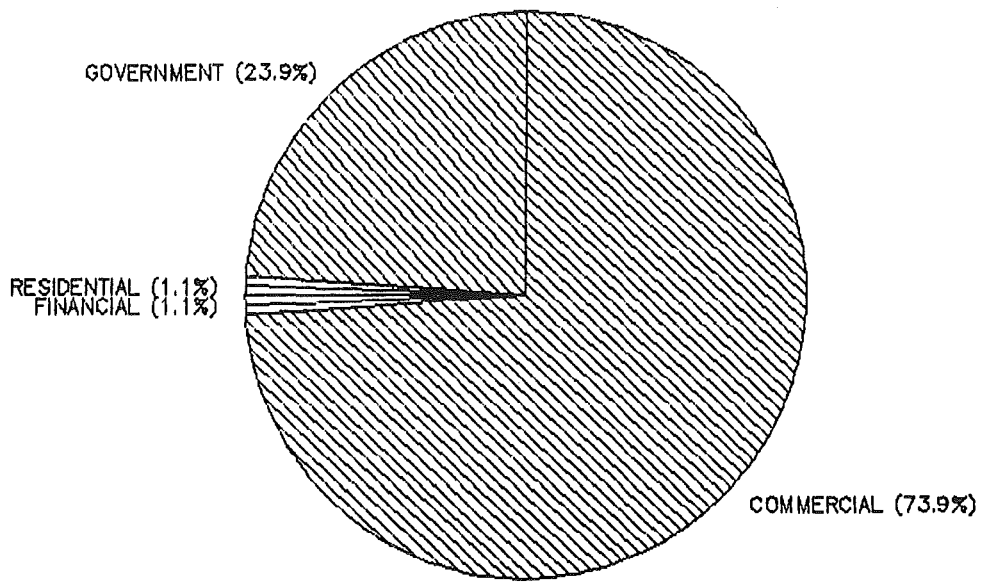

FIGURE 14

INTRUDER DETECTION SYSTEMS

GENUINE – SEPTEMBER 1989

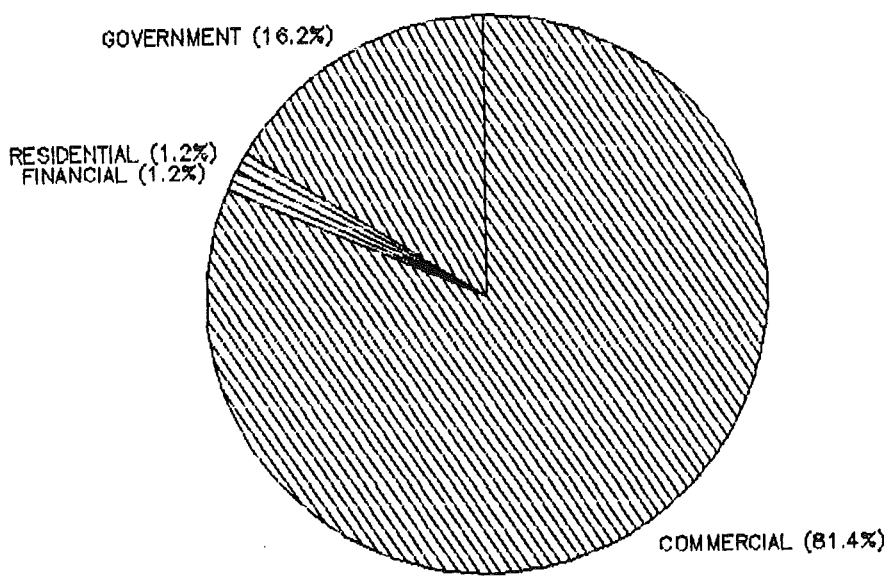

FIGURE 15

DURESS SYSTEMS

FALSE ALARM – MAY 1989

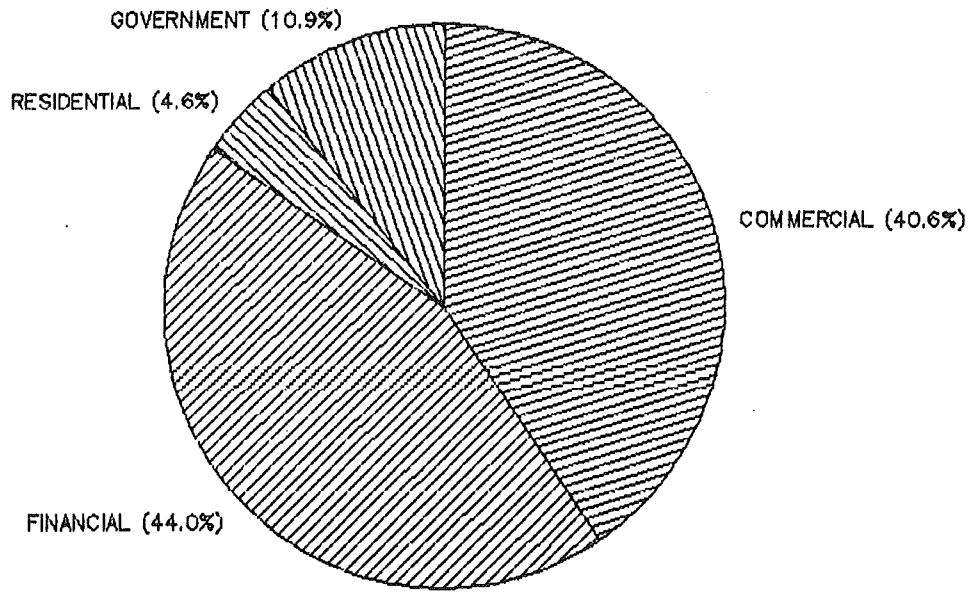

FIGURE 16

DURESS SYSTEMS

FALSE ALARM – SEPTEMBER 1989

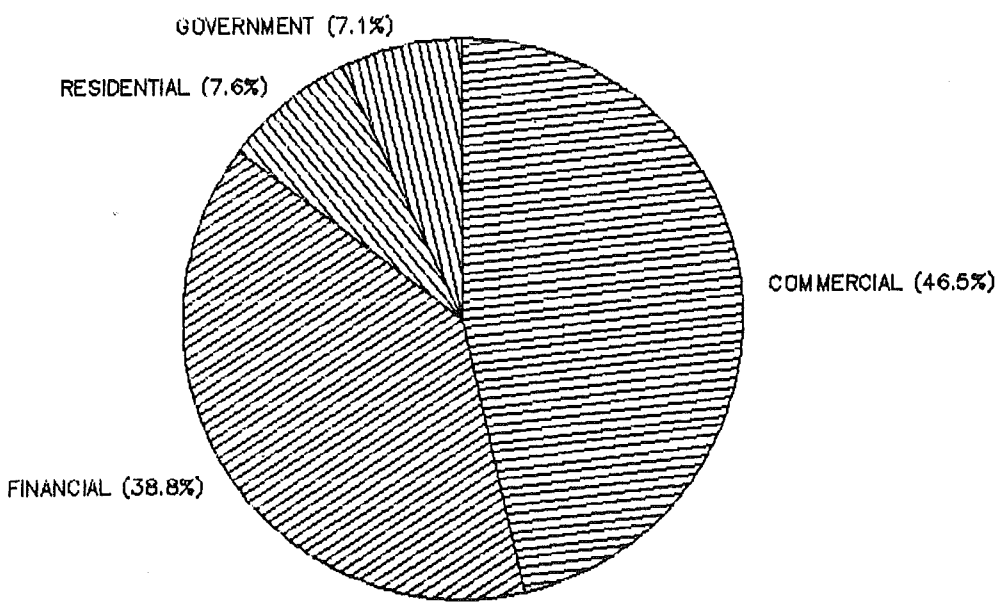

FIGURE 17

DURESS SYSTEMS

GENUINE – MAY 1989

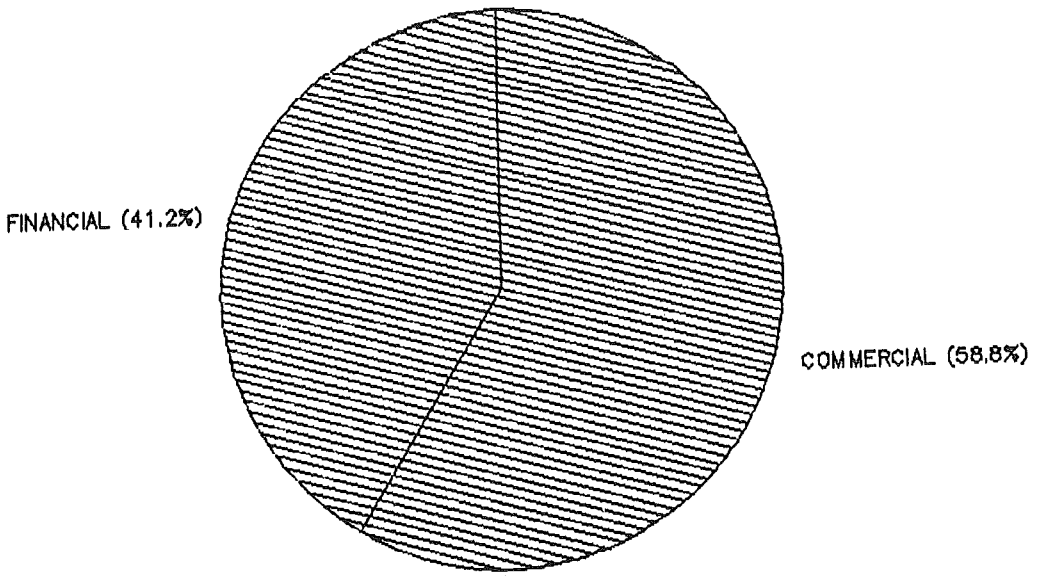

FIGURE 18

DURESS SYSTEMS

GENUINE – SEPTEMBER 1989

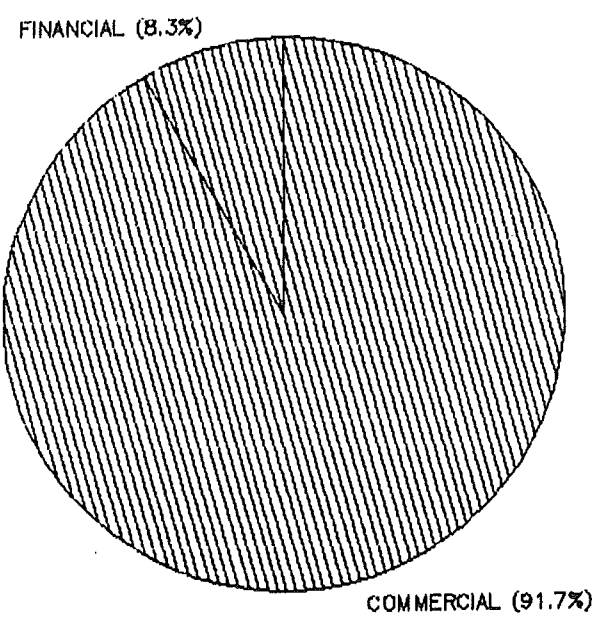

FIGURE 19

It can be observed that over 70% of activations for intruder detection alarms occur in commercial premises. For duress alarms over 80% of activations occur in commercial and financial premises with roughly equal numbers for each type.

Of particular interest is the percentage of activations which are genuine for each type of premises. Tables 2 and 3 below summarise this information.

INTRUDER DETECTION ALARMS

PERCENTAGE OF GENUINE ACTIVATIONS

	Commercial	Financial	Residential	Government
MAY	6.8%	1.3%	1.2%	14.9%
SEPTEMBER	7.2%	1.8%	1.0%	6.1%

Table 2

DURESS ALARMS

PERCENTAGE OF GENUINE ACTIVATIONS

	Commercial	Financial	Residential	Government
MAY	12.3%	8.3%	0%	0%
SEPTEMBER	12.2%	1.5%	0%	0%

Table 3

For intruder detection alarms the percentage of genuine activations for government buildings varies considerably between May and September. This variation is a consequence of a greater number of break-ins during May in government schools and a significant increase in the reported activations for government schools in September which were false. Of particular interest is the percentage of genuine activations for financial and residential intruder detection alarms which are consistently low (less than 2%). Attention should be given to such alarms to reduce the high incidence of false activations.

For duress alarms the percentage of genuine activations for financial institutions is significantly less for September. This is the consequence of the reduction in financial institution hold-ups from 7 in May to 1 in September.

Activation Frequency: False Activations per Activated System

The suggestion was made in [1] that systems registering more than three activations per month or more than ten false activations in six months be given special consideration leading to the possible withdrawal of police response to that system. In the South Australian case, after three false activations in a 28 day period, police services are withdrawn unless the owner agrees to pay an attendance fee A similar system of fees is being considered for Western Australia. The graphs in Figures 12 and 13 depict the percentage of activated intruder-detection systems that registered fewer than three or three or more false alarms for May 1989 and September 1989 respectively. These show that the overall percentage registering three or more false activations per month rose from 8.7% in May 1989 to 10.2% in September 1989. However, the percentages varied considerably for the individual monitoring agencies as seen in Table 4. In May 1989 Company 4 had the figure of 14.1% , while that for Company 3 was only 4.6%. The figure for Company 8 rose from 9.7% in May 1989 to the very high figure of 22.0% in September 1989.

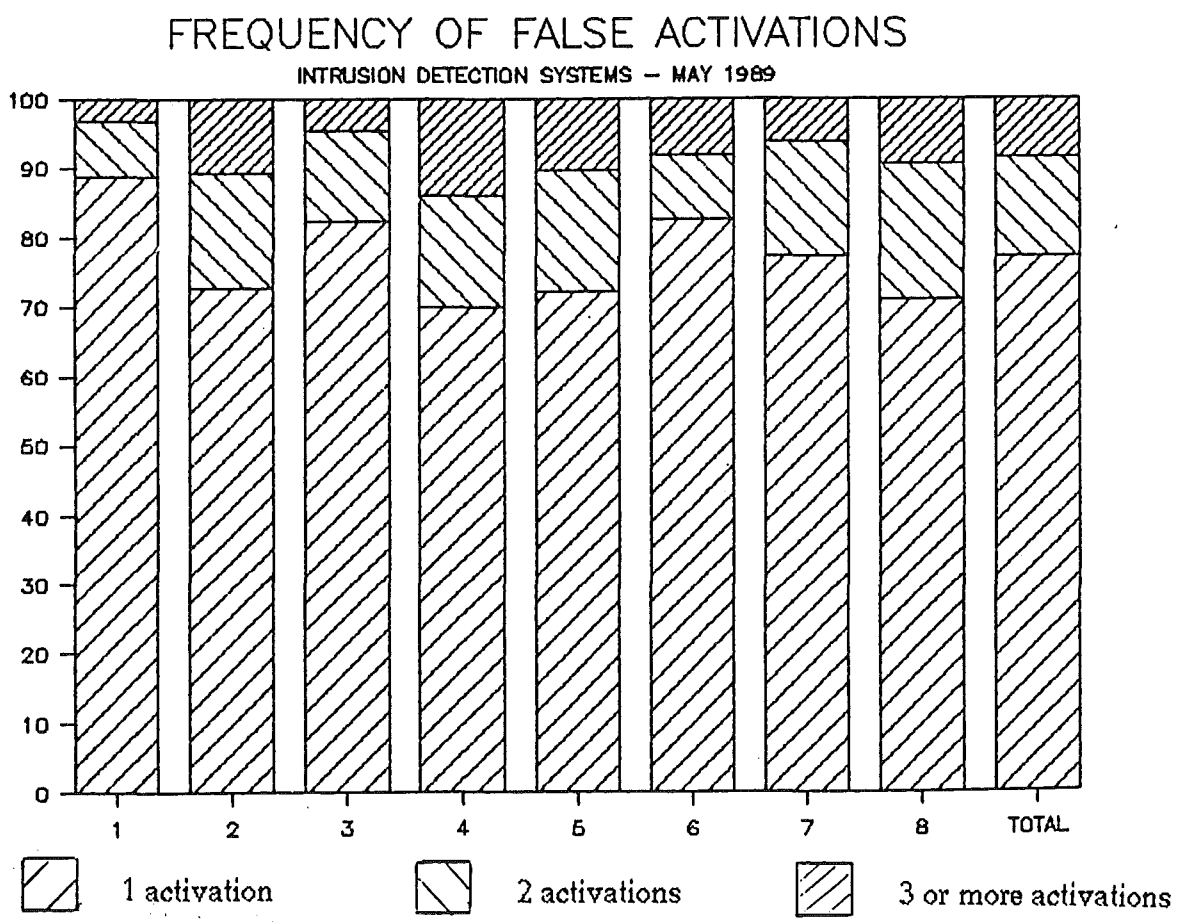

FIGURE 20

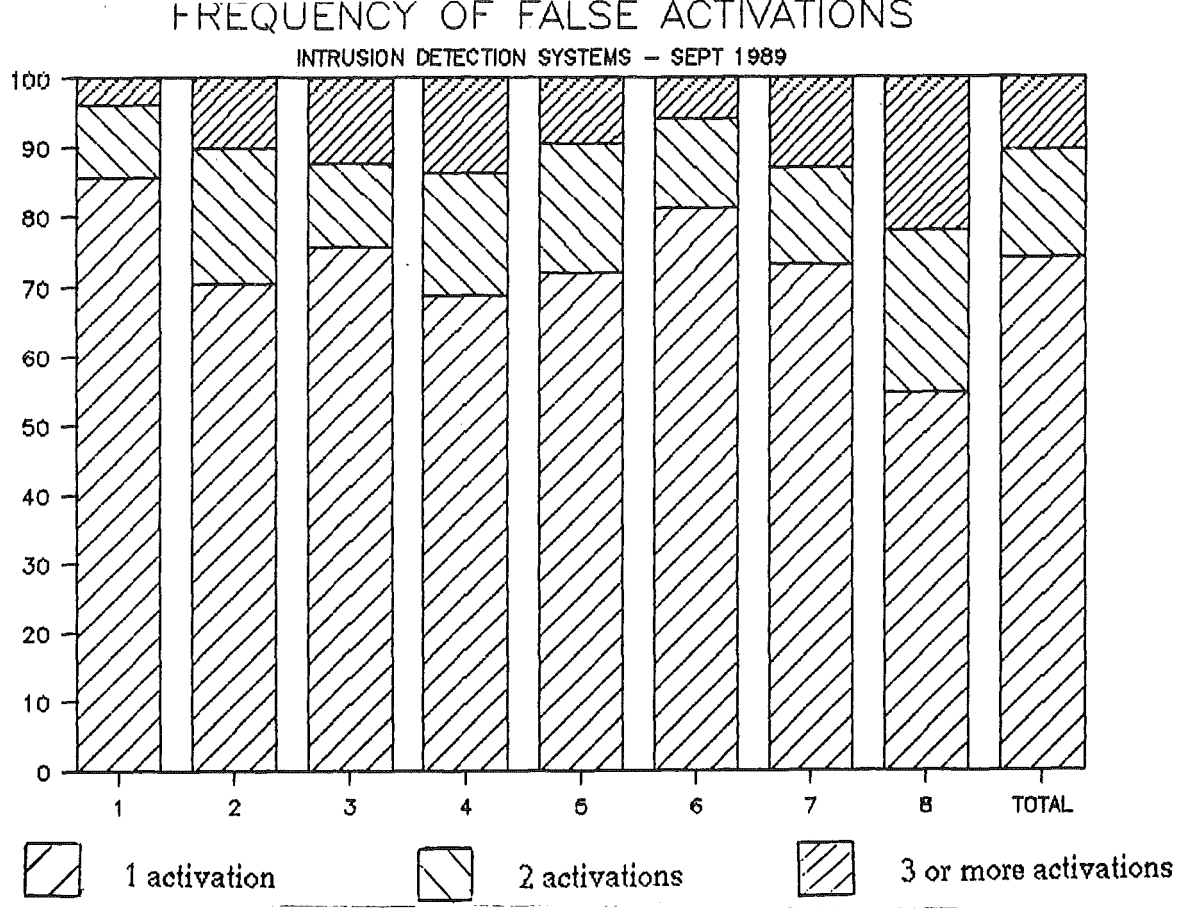

FIGURE 21

The average number of activations for activated intruder detection alarms was 1.40 for May and 1.46 for September. One alarm system had a total of 18 false activations reported to the police in May and another had 21 in September. Systems like this place excessive demands on the police and on the taxpayers money. Measures need to be taken at central monitoring stations to monitor the frequency of alarm activations and to take appropriate action in checking alarm systems which exceed more than 3 false activations per month.

INTRUDER DETECTION ALARMS

PERCENTAGE OF ACTIVATED SYSTEMS
WITH 3 OR MORE FALSE ACTIVATIONS

	1	2	3	4	5	6	7	8	TOT
MAY	3.3	10.9	4.6	14.1	10.5	8.2	6.4	9.7	8.7
SEPTEMBER	3.8	10.2	11.2	13.6	9.6	5.9	12.9	22.0	10.3

Table 4

Conclusion

Security systems are necessary for the protection of property, people and information. Their effectiveness is however reduced with the unacceptably high rate of false activations. As police have an obligation to investigate all such activations, there is increasing pressure on limited resources and a spiralling of costs in providing services. It is clear that there is an urgent need to reduce the incidence of false alarms.

This study examined data on all reported electronic alarm activations in the Perth Metropolitan Area for the months of May and September 1989.

The study included an analysis of the hourly and daily frequencies, cause of activation, type of premises and activation frequences per activated system for both Intruder Detection and Duress alarms.

For intrusion detection alarms it was found that hourly frequency of both genuine and false alarm activations peaked between 9pm and 4am, with the percentage of genuine alarms above 10% from midnight to 4am. While the number of activations were considerably less during the day the percentage of genuine alarms was less than 5% for most of this period.

While there was no clear trend detected for the daily frequency of genuine activations the greatest number of false activations occured on the weekends. In examining the cause of activations the percentage of genuine activations was found to vary considerably between central monitoring stations. However a significant number of false activities were of unknown cause.

An analysis of the type of premises indicated that the percentage of genuine activations for financial and residential premises was found to be less than 2% for all monotoring stations as compared with over 6% for commercial and government premises.

Finally, it was found that the percentage of activated systems that registered three or more activities in May or September varied considerably between central monitoring stations but was overall too high.

For duress alarms it was found that while genuine holdups were relatively constant throughout the day, the false activations peaked between 8am and 5pm during the normal working week in financial institutions. With 35% of all false activations linked to human error it is clear that a training process should be introduced to educate clients in the correct use of these systems.

The introduction of police attendance fees similar to that operating in South Australia should be seriously considered for implementation in Western Australia. However, rather than the withdrawal of police services after 3 'false' activations within any 28 day period, an attendance fee for further 'false' activations or for all 'false' activations should be charged to the alarm owner. This would protect the integrity of the police force and result in the owner being more responsible for their alarm system both in terms of its use and maintenance.

Central Monitoring stations should be encouraged to follow up the cause of alarms. If the cause is a result of client error, then the client should be made aware of the problem. The frequency of activations for alarm systems should be monitored and action taken where equipment installation or detectors are at fault. Every effort should be taken to encourage clients to enter into maintenance contracts. Without regular maintenance it is inevitable that the frequency of 'false' activations for the system will increase.

While it is important to encourage the purchase of alarm systems monitored by a central station to protect property, people and information, it is even more important that the system is appropriate for the physical environment, is correctly installed and is adequately maintained. Through education, the owners of the system should be informed of the correct operation of the system, the need for regular testing of the system and recording of activitions and their causes. Through these measures the false alarm rate can be reduced resulting in a more efficient use of police resources.

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