BEDFORDSHIRE AND LUTON FIRE AND RESCUE SERVICE

FIRE SAFETY GUIDANCE NOTE

NO 72

REDUCING UNWANTED FIRE SIGNALS

1 Introduction

Nationally and in Bedfordshire and Luton, statistics have demonstrated that over 98% of all Automatic Fire Detection Systems (AFDS) actuations are not caused by fires. These unwanted fire signals (UFS) reduce the capability of the service to respond to genuine emergencies and the time available to spend upon other community safety activities.

This service attends in excess of 10,000 incident calls each year – nearly a quarter of those calls are false alarms generated by automatic fire detection systems (AFD). Calls to fires that turn out to be false alarms.

The Service has a duty to secure both the safety and welfare of the communities it serves and its staff, together with ensuring the continued efficiency of limited resources.

Improving the reliability of the fire alarm system is one of the first steps that occupiers/owners can take. This guidance note provides examples of good practise that can be adopted to reduce false alarms. Where examples include manufacturers information these are provided as examples only and are not necessarily unique recommendations or endorsements.

2 Common causes of unwanted fire signals from automatic fire detection systems have been identified and published:

- **Cooking fumes** being detected by another detector in an adjacent area eg optical smoke detector located outside of a kitchen, which is correctly protected by a heat detector. The propping open of the kitchen door is the main problem, especially where the optical smoke detector outside in the adjacent area is very close.

- **Steam and aerosol sprays** activating optical smoke detectors due to poor procedures and management.

- **Contamination of detector** by ingress of insects, dust, pollen etc. This can cause a change in the sensitivity of the detector, and in the case of an optical smoke detector cause false activation. New detectors are designed to compensate for a build-up of dust.

- **Incorrect type of detector** used to protect an area or zone. A typical example is where there has been a change in the use of a room, e.g. where a kettle or a toaster is introduced.

- **Contractors working on site** causing dust to enter optical smoke detectors or producing close proximity electrical disturbances affecting the alarm system. The detectors in the area should be temporarily covered, or the zone isolated from the fire alarm system during the work period, and control measures introduced.

- **Failure to notify the alarm monitoring station**, with information that a fire alarm system is being tested or maintained.

- **Unsatisfactory maintenance / testing programme** in place, where detectors are rarely if ever, cleaned and serviced.

- **Undesirable siting of a detector** within the area being protected, especially where excessive air movement due to mechanical ventilation or open windows prevails.

- **Lack of premises occupier involvement** in "owning" their fire alarm system, e.g. where initial investigation of the cause of an alarm should be made before the fire service is summoned.

3. Technical Solutions

- **Use of a transmission delay of up to 8 minutes**, subject to risk assessment, as recommended in British Standard BS 5839 Part 1 2002, would enable a quick assessment of the alarm situation to be carried out before allowing the signal to be automatically sent if necessary, to the fire service via the Alarm Receiving Centre (ARC).

- **Consider re-configuration of the AFD system** to be carried out by the alarm maintainer so that in specific areas, the activation of a detector would need to be backed up by another activation of an adjacent detector before the alarm system went into full alarm mode. This offers a more reliable arrangement in circumstances when environmental effects can readily cause false alarms, without increase of risk in the protection of the area.

- **Consider taking the AFD system off line** during the fully occupied and active hours of between, for example, 7am and 9pm when most false alarms occur, usually due to cooking fumes. Particularly recommended when workmen are on site. A variation on taking alarm systems 'off line' during working hours is to permit calls from manual call points to actuate the call via the ARC to fire Control. NB. A risk assessment is advisable in each case.

  The practice of encouraging residential care properties to be remotely monitored ie 'On line' has been the case for many years but has recently been under review. Reactions by the staff especially during the active times of the day, to the alarm sounding and quickly taking appropriate action would prevent many unnecessary turn-outs of the fire service, with the knowledge that if in any doubt the staff can always dial "999". It is a fact that 70% of false alarm calls occur between the hours of 7am and 7pm.

- **Employ the *CookerMiser* device** where cooking fumes in kitchens regularly pass through doors, which have been wedged open, affecting the smoke detector outside. The device senses a flow of current when the cooking appliance is switched on and automatically activates an extractor fan for a period, which exceeds the time the cooking appliance is in use. Particularly useful in student accommodation situations etc. where false alarms due to cooking fumes are high.

  Example: The above approach has been extensively used in Nottingham Trent University to good effect, together with an arrangement where a nominated student in the block is responsible for checking out and reporting whether an activation of the fire alarm system is due to a real emergency or is a false alarm, before the Fire Service is called by the security staff. Financial enticements and fines for irresponsible behaviour are also used.

- **Consider the use of alternative fire detector** where a particular environmental problem exists and the originally specified detector is prone to false alarm and now considered to be inappropriate.

  Example: Hotel / student bedroom with integral shower room where steam can activate an optical smoke detector when the shower room door is left open. An ionisation chamber smoke detector has been successfully used in place of the original smoke detector which was centrally located in the bedroom, adjacent to the shower room door, as part of a new analogue addressable fire detection system in a residential training complex.

- **Control of source of environmental effects**. Environmental effects known to activate smoke detectors can be effectively minimised by applying control measures or by implementing new or revised management procedures.

  Example: In hospitals where food trolleys have been known to activate smoke detectors in the vicinity when plugged into a convenient mains socket outside wards and opened, releasing steam. A simple remedy is to mark out an identified safe area on the floor using yellow/black tape, where the trolley can be positioned and then opened without the likelihood of causing false alarms to occur.

- **Substitution of a carbon monoxide fire detector where practical**. This detector is not activated by dust, insects, steam or cooking fumes. It only responds where carbon monoxide levels of 40 ppm or greater are detected, as generated by a genuine fire.

4 Recommendations on the use of the Carbon Monoxide Fire Detector

Where an automatic fire detection and alarm system is required, Carbon Monoxide (CO) Fire detectors should be viewed as supplementary detectors and positioned in areas of higher risk for the applications previously identified.

Example: In a students Halls of Residence, an addressable fire alarm system can be designed using standard detectors throughout with the exception of in the students' bedrooms and immediately outside the communal kitchens, where CO Fire detectors are used. This can significantly reduce the high number of false alarms due to cooking fumes.

The CO Fire detector is not recommended to replace optical smoke and heat detectors as a general rule where these standard types of detector remain the first choice.

Physically, the CO Fire detector is very similar to an optical smoke detector, and is produced in conventional and analogue addressable versions. Therefore a change from an optical smoke detector to a CO Fire detector can usually be incorporated within an alarm system if compatibility is verified.

Unsuitable applications

The use of a CO Fire detector is not recommended where protection is required against fire risk in situations where little or no carbon monoxide is generated. Examples include:

- Early stages of electrical fires and burning cable
- Pure metal fires
- Fast burning chemical fires

5 Sheltered Accommodation - Problems associated with cooking fumes:

When a fire detector in a flat is connected to the automatic fire detection system in the main building, the type and location of the detector should not render the whole system vulnerable to a false alarm originating from the flat. The general use of an optical / ionisation smoke detector in this situation is prone to false actuation, typically due to cooking fumes and steam.

A heat detector, located in the hallway within the flat near the door separating the flat from the communal escape route, could be used instead of the optical smoke detector in this instance, but additional provision of stand-alone smoke detection would be required to provide early warning of a fire to the resident.

Provision of early fire warning to residents

Stand alone smoke detection should be provided in the flat, mains powered with battery back-up, to alert residents of a possible fire hazard. A minimum of one detector should be installed, located in the common area and escape route e.g. the hallway, but for maximum protection, inter-linked smoke detectors could be additionally required in the bedroom and lounge, depending on the size and layout of the dwelling.

Tunstall Speech Call Unit

The practice of hard-wiring a smoke detector to the Tunstall Speech Call unit as a means of providing an automatic alarm signal in the event of a possible fire situation, is a common one in sheltered accommodation. The arrangement, which is monitored remotely by a Central Social Alarm Control, has been found in many cases to be unreliable and a recognised source of false alarm call-outs. Most of the equipment, especially the ionisation chamber smoke detector used, has been found to be over 15 years old, and well outside the recommended working life.

Option 1

Improve the effective use of the Tunstall Speech Call system by not having the present type of smoke detector currently used connected, so that the system can then be used more reliably by the resident and the Central Alarm Control in any possible emergency situation. This is a particular problem where a communal area alarm system and the hard-wired detector system are actuated simultaneously (usually falsely) and the Tunstall voice communication is seriously degraded as a consequence.

NB. The provision of stand-alone smoke detection as detailed above is recommended.

Option 2

Where the arrangement of utilising the Tunstall Speech Call system combined with a fire detector is continued due to necessity for the protection of occupants identified as particularly vulnerable, then the following conditions must apply:

- The Tunstall Speech Call system must be maintained to a high level of reliability with a fault-free proven record. Replacement of old equipment is recommended, where the age of the Tunstall unit and smoke detector is more than 5 to 10 years old, and should be given high priority.

- The fire detector should be of the recognised photoelectronic type BRK (9000/23), compatible with the Tunstall System.

NB. New Tunstall Speech Call equipment employing the improved photoelectronic smoke detector has been found by Sedgefield Borough Council in County Durham to be effective and reliable with a reduction in false alarms.

Further enquires relating to unwanted fire signals can be obtained from Bedfordshire and Luton Fire and Rescue Service:

Tel: 01234 351081 Fax: 01234 845035

E Mail: bedfadmin@bedsfire.com Web: www.bedsfire.com

References:

CFOA policy: response to remotely monitored fire alarm systems, implementation guidance for fire and rescue services.

British Standard 5839 2002- Fire Detection and fire alarms systems for buildings- Pt 1: Code of practise for system design, installation and servicing.

Reducing unwanted fire signals from Automatic Fire Detection systems, tool box of best practise – George N Ware I Eng, MIE.

ARM(N)/SN
(17.6.05)

APPENDIX

TABLE 1
SUITABLE LOCATION FOR SMOKE DETECTORS

Location	Ionisation	Optical	Reason for Choice of #
Corridor/Walkway	A	#	Air current may exist
Stairway	A	#	Air current may exist
Elevator Shaft/Duct	NA	#	Air current is present Smouldering is probable
General Office/Day Room	#	#	
Conference Room	#	#	
Waiting Room	#	#	
Hotel Guest Room/Hospital Ward	NA	#	Fumes/Air current
Hotel Foyer	#	#	
Dining Room	#	#	
Lobby Hall	A	#	Air current may exist
Department Store/Market	#	#	
Theatre Stages and Audience Hall	#	#	Use of theatrical smoke may present a problem
Substreet/Walkway	NA	#	Air current exists
Warehouses	#	#	Not if diesel or propane forklift trucks are operating in area
School	#	#	
Library Room	#	#	
Public Meeting Hall/Gym	#	#	
Stage Setting Room	#	#	
Clinic Room	#	#	
Nursery Room	#	#	
Treatment/Operation/Child-Care Room	#	#	
Laboratory	NA	#	Prevents false alarm due to naked flame
X-Ray/Treatment Room	NA	#	Radioactivity

Photo Studio/Beauty Parlour	#	#	
Dark/Developing/Copying Room	NA	#	Possibility of a flaming fire
Studio/Recording Room	#	NA	
Machinery/Electrical Room	#	#	
Factory/Workshop	#	#	
Church/Chapel	#	#	
Telephone Exchange Room	A	#	Smouldering fire
Cargo Handling Area	NA	#	Presence of air current and dust

# = Most acceptable detector
A = Acceptable detector though not necessarily the best
NA = Not acceptable/applicable in general

TABLE 2
SUITABLE LOCATION FOR HEAT DETECTORS

Before selecting the type of heat detector it is necessary to confirm the environment into which the installation is to be placed. Are there local heat generating facilities such as ovens, burners, process machinery etc? What is the maximum temperature normally achieved in the protected area, etc?

Location	Rate of Rise	Fixed Temp	Fixed High Temp	Reason for Choice of #
Boiler Room	NA	#	#	Rapid changes in room temp
Drying Room	#	NA		
Kitchen	NA	NA	#	Avoid locations over ovens
Covered Car Parks within Buildings	#	NA	NA	
Loading Bays	#	NA	NA	
Smoky Atmosphere	#	NA		

# = Most acceptable detector
A = Acceptable detector though not necessarily the best
NA = Not acceptable/applicable in general

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