Detection systems in custodial establishments

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BRE Fire Research Conference, 9th June 2016
Custodial establishments are still required to meet legislative requirements.

**Existing buildings**
Fire risk assessments required in the UK for custodial establishments as they are work places.

– The Regulatory Reform (Fire Safety) Order 2005 - known as the RRO or FSO
– Applies to England and Wales
– Fire Safety (Scotland) Regulations 2005
Legal requirements

New build

Buildings must meet the functional requirements of the Building Regulations 2010.

– Fire strategies to the guidance of Approved Document B

Or

– Fire Safety Engineering
Approved Document B Fire Safety

- B1 Means of warning and escape
- B2 Internal fire spread (linings)
- B3 Internal fire spread (structure)
- B4 External fire spread
- B5 Access and facilities for the fire service

- Or use fire safety engineering detailed within a fire strategy document.
B1 means of warning and escape

Custodial establishment are exempt from the full requirements of B1 in terms of means of escape!

However,

- The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and there must be means for giving early warning of fire for persons in the building.

- Design guidance is provided in the MOJ ‘Fire Safety Design Guide for Custodial Property’
Unique environment
Prison sites have a wide range of functional areas:
- Offices
- Small/medium places of assembly (visits hall)
- Babies and young children as visitors
- Babies resident in Mother and Baby residential blocks.
- Educational workshops/classrooms for inmates
- Industrial workplaces – CD/DVD grinding, computer dismantling, books…….
- Kitchens and laundries
- Plant rooms/energy centres
- Residential cell blocks
- Medical blocks
MOJ specification for detection

There is a technical specification issued by the MOJ for the installation of detection systems in cells STD/E/SPEC/038.

Key requirements:
- Resilient to cigarette smoke (e-cigarettes?)
- Nullify attempts or give a warning that attempts are being made to defeat the system.
- Must be maintained
- Must meet the performance requirements of functional tests described covering smouldering and flaming fires using newspaper.
Current cell detection systems

A range of systems are used at different establishments.
– Older sites had no detection at all
– Some sites use domestic point detectors as an interim measure.
– Point detectors in cells not used where high rates of vandalism are foreseeable and common – such as Segregation cells and Young Offenders cells.
– Detectors are sometimes positioned inside ventilation ducts. Various arrangements are used:
  – one detector serves eight cells connected to a common duct and is 10m from furthest cell.
  – One detector serves four cells connected to a common duct.
  – One detector per cell just behind the cell ventilation grille.
Cell detection arrangement

- Fire detector
- 10 m
- mezzanine floor
- second floor
- mezzanine floor
- ground floor
Cell detection arrangement

- Roof
- Mezzanine floor
- Second floor
- Mezzanine floor
- Ground floor

Fire detector

Cell

10 m
Cell detection arrangement

- roof
- mezzanine floor
- second floor
- mezzanine floor
- ground floor

- 10 m

- Fire detector

Cells are labeled at various points throughout the diagram.
Cell detection

- In cells point detectors may use multi-criteria (typically optical / CO / heat) detectors to help reduce the risk of false alarms from cigarette smoke and joss sticks.

- For single criteria detectors optical systems tend to be used.

- Modern systems are fully addressable so devices in a number of `zones’ are often supported on a common loop – the intelligence is at the panel to identify the location.

- Common for sounders and Voice Activation Devices to be supported and powered on the same loop wiring as detectors and manual call points.
SJS requirements

BRE Global have been working with Sodexo Justice Services for a number of years on their five prisons.

SJS knew that MOJ had been using wireless detection systems in one of their prisons and wanted to ascertain the potential for using such systems in their prisons.

SJS therefore approached BRE Global to undertake a desk-top study to determine the potential for their use.

A Briefing Paper was drafted and presented at the Prison Fire Safety Forum.
Wireless detection – current

– Point fire/smoke detectors are considered unsuitable for use in cells, particularly Segregation and Young Offender cells, due to vandalism.

– Ventilation duct detectors can be difficult to access for maintenance and have longer response times.

– MOJ have been using wireless detection systems in cells in one of their prisons for a number of years.
Wireless systems

- Wireless fire detection systems have been around in the UK for over 15 years, since then advancements in technology have meant that the systems have become more sophisticated, reliable and more widely accepted amongst the major fire detection system manufacturers which are now developing, supporting and selling wireless products.

- Complex and simple fire detection networks are possible which span numerous buildings, this is ideal for institutions made up of multiple buildings.

- A wireless system may also form part of a hybrid system using both hard wired and wireless detectors.

- Components of a wireless system are not much different from standard hardwired devices

- A typical control panel can support up to 250 wireless devices.
Advantages

– easy and quick installation – no wires are involved.
– cheaper installation – fire-rated interconnecting cables are not required, lower labour costs.
– Less susceptible to failure in fire – not susceptible to the failure of cable during a fire.
– Reduced disruption during installation – systems can be installed in hours with no need to drill through walls for routing wires.
– Minimal damage to the building fabric – ideal for listed buildings
– Flexibility – easily upgraded and changed and can be used as a temporary system.
Advantages

– ideal for buildings which are spread apart and is easily expandable.
– easier to maintain – the detectors will not be inside ventilation ducts
– can link to existing systems wireless or hardwired.
– Detector heads can potentially be fitted as anti-ligature to only support approximately 2.5 lbs.
– Detectors can alert the control panel if tampered with.
– Visual checks can be made of in-cell detectors by prison staff if duct systems had previously been used.
Disadvantages

– Initial costs higher – equipment costs tend to be higher.
– Interference problems – problems can occur where there is a high concentration of radio signals, although multi-channel signaling ensures that if a signal does get blocked the detector will auto change to an alternative frequency.
– Battery replacement – batteries have to be replaced every couple of years, which could be an arduous task for a system comprising of many wireless devices. They will also be very attractive to prisoners which is a major issue.
– Removal of system components – a system component may be removed but still remain within wireless range, this may not appear as a fault warning on the control panel.
Disadvantages

- Blocking - radio signals may be blocked where walls are particularly thick.
- They will not work inside metal cell ventilation ducts.
- For large areas, a wireless system can have an issue transmitting information to the main control panel.
- Black spots on site.
- Structural changes to the building could result in attenuated radio signals.
Radio survey

- A radio survey must be carried out before any installation of a wireless system to determine if a wireless fire detection system is suitable for the building.

- This survey helps to understand how a signal propagates through a building, determines the ambient electromagnetic environment, any potential interfering sources and the best communication paths and positioning of components for optimal functioning of the fire protection system.
Third party certification

– When a product is bought it is expected that it will work, having approved certified systems such as provided by LPCB ensures that a product or service is reliable, safe and offering a level of quality non-certified products may lack.

– However good a product is, if it is not installed correctly it may not work when it is needed the most. Third party certification schemes, ensure that installers are competent.

– For the manufacturer, certified products can be more quickly identified by consumers and is seen as a trustworthy choice within the marketplace.
Conclusions

Use of wireless systems by the Ministry of Justice and initial pre-installation surveys by Sodexo have also shown their potential.

The advantages highlighted show that wireless systems can be installed with little disruption to the day-to-day operations and can be moved or upgraded alongside hard wired systems with relative ease. However, they have to be installed in the cell not in the ventilation ducts and so are prone to vandalism and the batteries are sought after!

There will soon be a smoking ban in cells so smoking materials will not be allowed – reduction in cell fires?
Thank you

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