



The Challenges of Managing Complex Buildings

Sector White Paper

Introduction

This paper describes, in summary:

- The nature of complex building design
- The challenges facing management of complex buildings
- How to ensure and demonstrate compliance to fire and other security policies manage risks and deliver best-possible outcomes to incidents.

The Nature of Complex Building Design

Few of us can fail to notice the way in which technology and its use has revolutionised day to day life; increasingly computer technology allows developments in almost all walks of life that 20 or 30 years ago few could have imagined.

These developments are most noticeable in the every day things that we use, but just as, for example, the automotive industry has been advanced through the use of technology in the development of automobiles that we can see and use every day; equally radical, less noticeable, but nevertheless important changes have been taking place in the construction of buildings many of us will frequently use.

It is not just the materials used in the construction of buildings that has changed but also the sophistication of, and development of, new systems that control the building environment. This has meant that it is now possible to build buildings that previously no one thought imaginable. There are a number of drivers behind these developments, not least commercial considerations.

Lets for a moment take just one example – shopping centres.

The construction of the Metrocentre in Gateshead signalled a dramatic change in the retail sector and a move from the more traditional high street retailing. In part this has been as the result of the consumers desire for more accessible and enhanced retail and leisure offers; and has lead to the building of a number of similar developments throughout the United Kingdom, indeed development of shopping centres continues at an almost bewildering rate.

For most of us these shopping centres are buildings in the conventional sense. We see one structure and think of it as a building. In fact it is not a building but a series of buildings under one roof.

A parallel comparison would be to consider the unlikelihood of encasing a city or town centre under one massive glazed roof, the end result would be exactly the same. To compensate for technological advances in building design a complex set of rules and regulations lay down what developers can do and the important factors to be taken into consideration. One of the most important sets of rules and regulations are Building Control Regulations, which set out the criteria with regards to one of the most important aspects of building occupation and which almost all of us take for granted – fire safety.

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Every one of us expects that building owners take responsibility for our safety when we visit their buildings and in the event of fire occurring that the alarm can be raised and everyone safely evacuated. The role of Building Control Regulations is to ensure that this is the case, with the regulations recognising that there are three important, separate, but linked elements to the building.

- Compartmentation
- Life/Fire Safety Systems
- Management Procedures

Compartmentation

Compartmentation is achieved through the use of fire retardant materials to limit the spread of fire occurring in a shopping centre. Further fire suppressing is achieved by the use of sprinkler systems, which are designed to extinguish a fire occurring within a shop unit or other protected area in a centre.

Consequently it is important that compartmented walls are not breached and that fire loadings within sprinkler protected areas do not exceed that which the sprinkler system within that area is capable of extinguishing.

Compartmentation also means that it is no longer a requirement to evacuate an entire centre, only the area in which the fire occurs, because it is intended that the fire should be contained within that area. As a result the widths of means of escape routes (emergency exits out of the centre) are designed only to accommodate the numbers of people that require evacuating from that part of the building.

Life Safety Systems

The need only to evacuate the area of the centre affected by fire has resulted in complex system programming to ensure that fire can be detected in the early stages, the right areas are evacuated and the right systems in the right part of the building. For example smoke curtains and smoke extract operate to maintain the 'open' mall area as a place of comparative safety. The process by which the systems correct programming is identified in the development of documented Cause and Effect.

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Typically a modern shopping centre will involve the installation of a number of systems, including the following, and commonly several of these systems will be programmed to operate simultaneously in the event of fire alarm activation:

- Automatic Fire Alarm & Detection System
- Automatic opening of fire escape doors
- Automatic Smoke Control Drop Curtains
- Colour Closed Circuit Television System with recording
- Emergency Lighting
- External Fire Hydrant System
- Fireman's Lifts and Stairs
- Hand Held Appliance
- Mall Smoke Ventilation
- Public Address/Voice Evacuation
- Radio Paging/Message System for Management Team Personnel
- Shop Alert System
- Sprinkler System
- Vehicle Management System
- Wet Riser / Dry Riser System
- Fire Shutters

The Cause and Effect is agreed during the design and construction process, and is developed from an agreed Life Safety or Fire Strategy. Agreed with Building Control, the Cause and Effect, and Life Safety Strategy is designed to be robust throughout the life of a centre, and any deviation from, or change to, should not be made without proper consideration being given to the affect that any such deviation or change would make to life safety.

Management Procedures

Management Procedures are the final element, and are predetermined by the way in which the centre is built with regards to compartmentation, and the way in which the life safety systems operate. In simple terms if the building is designed such that only the affected area evacuates then it is only the affected area that management evacuate, and adequate resources to facilitate the safe evacuation of the affected area and cordoning off of the area, must be available. To evacuate a greater area than that intended, particularly at peak trading times may actually place evacuees at greater risk because the means of escape from the centre will only have been designed to accommodate the evacuation of small areas of the centre and not the simultaneous evacuation of the whole centre.

The relationship between the three elements varies in each shopping centre, and accordingly the management evacuation procedures will be different from centre to centre. With specific procedures having been produced which take into account each respective centre's construction and life safety system operation it is important that these procedures are followed without deviation, particularly at times of maximum building public occupancy. To attempt to evacuate a shopping centre by any other means may place evacuees (the public) at greater risk from injury.

The relationship between, and the requirements of each of the three elements are determined before construction even begins, usually by the architect and may be referred to as the 'original design intentions'. It is important to bear in mind that the original design intentions actually provide the rationale behind the required management procedures even before the management team is appointed.

Sophistication, Co-operation and Collaboration

As we have seen the building of a shopping centre requires considerable co-operation and collaboration between the designers, the developers, the system installers and the centre's management team. It might also be expected that the sophisticated nature of the development, the systems and their integration would extend to the management procedures, but this is hardly ever the case. Walk into a shopping centre control room and you will find paper instructions to be followed in the event of fire alarm activation.

This 'traditional' approach is likely to cause problems, not least:

Different operational response depending on location of the fire

The specific operational response to a fire incident needs to take account of the different requirements of a fire occurring in a shop, the mall (common area), or the service corridors (back of house area). Then when one considers the different requirements when the shopping centre is open and when it is closed, and the opportunity for unplanned responses by the centre's control room staff then it becomes likely that as many as a dozen or so different response plans may need to be put in place.

Selection of appropriate response plan

How do the centre's control room staff and others with roles to play determine which response plan should be used; and how much time elapses whilst the Centre Management Team decide which response plan to use before they actually respond to what is happening on the ground?

Changes to usage over time

How long is it after the centre has opened before the original design intentions are forgotten?

Changes to personnel over time

How many changes in management does it take for the original design intentions to be overlooked?

How many changes in personnel does it take before all the knowledge gained in initial training, undertaken on the centre's opening, is lost?

Changes of ownership

What happens when the ownership of the building changes, will the new owners immediately recognise the importance of the original design intentions?

Misunderstanding of priorities

What happens when somebody in management doesn't understand the importance of the original design intentions and decides to reduce the number of centre staff to reduce cost without properly understanding the implications on fire safety?

With the majority of fire safety officers failing to understand the complexity of fire safety arrangements in complex buildings, the likelihood is that the original design intentions will be lost over time. Fortunately there has never been a significant fire in a modern shopping centre resulting in loss of life but more recently, and perhaps understandably, members of the Fire Protection Association have begun to raise concerns about the maintenance of compartmentation, life system cause and effect operation and management response plans within 'ageing' modern shopping centres.

Furthermore, whilst the Building Control Regulations provide guidance with regards to fire safety, there is no similar detailed guidance available or statutory requirements with regards to other incidents, which may result in the evacuation of a shopping centre, for example a bomb scare. How does centre management simultaneously evacuate all of a shopping centre, in the event of a suspect package being found and a bomb is suspected, when the building has not been designed to

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allow for such evacuation? And perhaps more importantly do others who may be involved, for example the police, understand the comparative complexity of the issues involved?

Consultants experience is that these are very real issues which need to be addressed, not least because of changes in legislation especially the Regulatory Reform (Fire Safety) Order which brings the current fragmented United Kingdom fire safety legislation in line with the European risk-based approach. The Order places additional responsibilities on building management to control fire safety through a constant and consistent process of risk assessment.

Compliance, Managing Risk and Ensuring Best Outcomes

Before assessing IPSecurityCenter and its role in building management we will take a few moments to look at what IPSecurityCenter actually is.

IPSecurityCenter is the most advanced security management control software available. It enables customers to build automated security policies and response plans – controlling and managing incidents and events through interactive operator guidance - delivering the best outcome to any incident and ensuring compliance to security policies.

Its powerful graphical interface delivers rapid configuration and management of the complete security environment - whether building, site, campus to whole region – local, national or global.

IPSecurityCenter does not impose fixed responses or specific ways-of-working on operators. Rather than providing a simplistic and inflexible system, limited to just handling alarms – it manages workflow, generates customer-specific operator prompts, receives and sends alerts and messages, monitors service levels/escalations and dynamically changes operator screens – all while maintaining an audit trail to generate on-demand customised reports.

Any device can be brought under IPSecurityCenter control – CCTV, intruder alarms, fire alarms, access control, personal alarms, building management systems, digital recording and business systems. This results in future-proof, flexible and cost-effective deployments for customers, more structured response planning and optimised decision-making.

IPSecurityCenter integrates proven fire alarm system cause and effect/operational response plans based on the actual plans developed for any type of sub-regional shopping and leisure complexes.

At each stage of handling the incident, operators must respond to the directions displayed in the operational response plan and record their actions, which set up a verifiable audit trail of activity undertaken by the centre's management team responding to a fire alarm activation in any unit or area within the centre. These scenarios can be complicated further because of two stage fire alarm activation, which can be particularly problematical to manage.

Despite that, IPSecurityCenter manages what happens when the control room operators fail to acknowledge the alarm activation in the control room and if the fire alarm system goes into second stage before staff arrive at the scene. These changes in the scenario result in both the system cause and effect and the operational response plan changing simultaneously to reflect what is actually happening within the building. Importantly these changes are automated and require no action on the part of the control room operators beyond acknowledging the changing operational actions required on the ground, and thereafter following the revised procedures displayed.

IPSecurityCenter can be used to easily verify and validate operational response plans and in doing so reduce cost. If changes are required to the response plan these can be easily carried out using the simple drag-and-drop visual design tools within IPSecurityCenter.

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The pre-determined automated decision-making process reduces the risk associated with the unpredictability of human response in an emergency, insofar as the operator takes no part in the important initial decision making, merely following on-screen instructions. In turn this reduces response time to the incident, important in the early stages of any emergency.

Perhaps most importantly from the management's perspective, IPSecurityCenter automatically creates a verifiable audit trail of actions initiated and actions undertaken throughout the incident. With the opportunity to formally agree the programmed operational response plan with the authorities beforehand, the likelihood of any prosecution under the Health and Safety Act or even indeed Corporate Manslaughter is greatly reduced.

The application of IPSecurityCenter by management will demonstrably show that they consider the safety of the public who visit their building important; another essential element of managing commercial reputational risk.

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