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MASS NOTIFICATION

Amassing Mass Notification Know-How

University, school and hospital administrators must understand the mass notification/emergency communication codes, planning process and available technologies. Conducting a thorough risk analysis and making the most of its findings is key.

By Peter Ebersold | June 01, 2011

All photos courtesy NOTIFIER and Gamewell-FCI

Mass notification is an area that has received a great deal of attention in recent years. Unfortunately this is largely due to tragic incidents that have exposed the vulnerabilities of certain populations and environments (specifically on university campuses), consequently emphasizing the need for better communications and alerting. Fortunately, a number of solutions are available to address these needs.

With numerous products flooding the market, however, it is often a challenge for campus decision makers to define a particular facility's mass notification system (MNS) needs and then move forward with the design of an effective solution.

The Origins of MNS

The term mass notification originated from the Unified Facilities Criteria (UFC), document 4-021-01 titled Design and O&M: Mass Notification Systems, created by the United States Department of Defense (DoD). The UFC outlines the design, operation and maintenance of mass notification systems required on all DoD properties, including posts for the Air Force, Army, Marine Corps and Navy.

The UFC defines mass notification as "the capability to provide real-time information to all building occupants or personnel in the immediate vicinity of a building during emergency situations. To reduce the risk of mass casualties, there must be a timely means to notify building occupants of threats and what should be done in response to those threats. Pre-recorded and live-voice emergency messages are required by this UFC to provide this capability."

The UFC recommends the use of a combined fire alarm and MNS, particularly in new construction of military facilities, where the building fire alarm control panel forms a single combined system that performs both functions. For smaller buildings, the public address (PA) system may also be integrated with this combined system, providing the PA system can be supervised for integrity.

Notification Codes and Elements

Initially seen as a "military solution," MNS are gaining popularity among many nonmilitary occupancies. The 2010 edition of NFPA 72: National Fire Alarm & Signaling Code includes the lengthy Chapter 24 that outlines requirements for the design and installation of emergency communications systems (ECS) within commercial

facilities.

While recent events such as the Virginia Tech campus shootings and severe weather incidents have raised demand for emergency communications systems (ECS) for commercial properties, the new National Fire Protection Association (NFPA) codes have begun to set a precedent of utilizing fire alarm systems to support the added duties of a supervised and more survivable ECS.

Related Article: Your Mass Notification Cheat Sheet

To serve as more than a common fire alarm voice evacuation system, NFPA 72 requires: "Security personnel should be able to effect message initiation over the MNS from either a central control station or alternate (backup) control station. Where clusters of facilities exist, one or more regional control stations might also exercise control." It also requires that the MNS should offer a "dynamic library of scripted responses to various emergency events that would be easily customizable to meet the needs of the individual customer."

To service this need, distributed messaging units commonly referred to as Local Operator Consoles (LOCs) are typically tied to the fire alarm/ECS network and placed throughout a facility or campus to provide authorized users a means for initiating live and prerecorded announcements, and even text messages.

Distributed recipient notification systems such as E-mail or reverse 911 systems offer alternative methods for alerting occupants. However, these technologies are not supervised for faults or breaks, nor do they encompass a more "survivable" design that would enable the ongoing delivery of accurate communications even if one or more parts of the system's network are down. Likewise, there are no codes or standards currently in existence that require these systems to be regularly tested and maintained to a specific level of performance.

NFPA 72 makes clear that distributed recipient notification systems such as text messaging or E-mail shall not be used in lieu of required audible and visual alerting ECS. This is due to the possibility of delivering conflicting information such as a text message directing a person to remain in place, while the fire alarm system in the building provides the evacuation message. If the fire alarm evacuation system is activated before the occupants received the message, there could be confusion.

For the same reason, NFPA 72 requires a building's fire alarm and ECS to be integrated and programmed to allow all ECS functions to supersede the fire alarm. This priority setting avoids the situation of a fire alarm evacuating a building while a message to "shelter in place" is sent through the same facility's ECS.

For large MNS, some solutions now offer VoIP technology to deliver live voice messages anywhere in the world via the Internet. These systems employ one or more workstations from which security or facilities personnel can send emergency communications via VoIP.

Combining Fire Alarm, ECS & MNS

At this point in time, a layered approach using a fire alarm/ECS and an integrated distributed recipient notification system is considered the best solution for reaching the largest number of occupants. However, the sequence of notifications (from all systems) must be considered, and any potential delays in the transmission of communications must be minimized. For these reasons, all systems should be integrated and coordinated with a facility's emergency plan (*see sidebar on risk analysis and emergency planning*).

In the midst of an emergency, flashing strobes accompanied by live or prerecorded audible instructions tend to have a much higher impact on occupants. At the same time, highly visual signs in large areas of assembly can offer information specific to the emergency or display a simple message such as "evacuate." To deliver voice instructions to those outside, large speaker clusters can be installed on the exterior of a building or throughout a campus.

Utilizing a combination of audible and visual notification devices, such as strobes, voice communications (indoor speakers and Giant Voice) and programmable LED signage is seen as the most intrusive solution for capturing the attention of occupants and delivering a clear, audible message.

Related Article: Incorporating Mass Notification Into New Fire Alarm Systems

For multiple buildings or campuses spread across a city, state or even the globe, some fire alarm manufacturers have harnessed the latest voice over IP (VoIP) technology, delivering live voice messages to anywhere in the world via the Internet. These state-of-the-art systems employ one or more workstations from which security or facilities personnel can send emergency communications via VoIP.

Fire alarm system manufacturers and installers work within a tightly regulated industry that was the first to create requirements for the design and installations of ECS for commercial properties. The marriage of ECS and fire alarm control systems is a growing trend that is expected to continue reaching into larger varieties of facilities and multibuilding properties, including K-12 schools, high-rise buildings, mass transit hubs and even public gathering places such as theatres, restaurants and places of worship.

Risk Analysis and Emergency Planning

By Jack Poole

When an emergency communication system (ECS) is required to be installed in accordance with the 2010 edition of NFPA 72, a risk analysis is required to be performed. The primary intent of the risk analysis is to perform a comprehensive assessment to characterize the likelihood, vulnerability and magnitude of incidents associated with natural, technological and manmade disasters, and other emergencies. It can then be determined how to best communicate the "real-time" emergency notification information so the ECS can be properly designed, installed and tested following a performance-based approach.

It is recommended the following stakeholders be integrated in the risk analysis and decision-making process:

- Authority Having Jurisdiction
- Facility owner/user/employees
- Facility/system maintenance staff
- Emergency response representatives
- Insurance company representative
- Fire protection design professional (FPE)
- Design and construction team representative

Distributed messaging units often referred to as Local Operator Consoles are typically tied to the fire alarm /ECS network and placed throughout a facility or campus to provide a means to initiate live and prerecorded announcements, and text messages.

With the risk analysis, the entity should attempt to prevent, mitigate and prepare emergency response and recovery plans for identified threats, hazards or emergencies that could significantly impact people, property, operations, the environment or the campus. As a component of this performance-based evaluation, the risk analysis should establish the specifics of how the ECS/MNS should operate, be designed, installed and tested.

The risk analysis should identify and prioritize the likely scenarios in which the system would be deployed. It should address risk, probability and loss effect, and determine which methods of communication to deploy. It should also identify the appropriate management plans and procedures to implement. The method of determining what system should be installed or the best way to communicate with the building occupants should not be haphazard.

The risk analysis needs to capture the number and characteristics of the people who are expected to receive the emergency message or instructions, and explain the extent of notification throughout the facility or complex. The risk analysis should also determine if and when mass notification messages should override the fire alarm message, as well as provide performance and survivability requirements for the system.

As one might expect, not all mass notification messages should take priority over the fire alarm messages to relocate or evacuate. Message priority for emergency conditions, such as severe weather warnings, gas leaks, chemical spills and other hazardous conditions, should be outlined in the risk analysis.

Ultimately, once the risk analysis has been developed and agreed upon by all stakeholders, the ECS/MNS can be designed, installed and tested.

Related Articles:

- Your Mass Notification Cheat Sheet
- Ensuring Emergency Messages Get Delivered at Carnegie Mellon U.
- Incorporating Mass Notification Into New Fire Alarm Systems