Mass Notification

A Mass Notification System (MNS) is something much more than an alarm system. By using the technologies based on fire alarm codes and standards, fire system manufacturers are able to produce a robust life safety solution. For the benefit of those considering an MNS to safeguard a particular building or complex, this article explains mass notification and its origins, the codes and standards' treatment of MNS, and the current cutting-edge technologies that are available.

Origins of MNS

The United States Department of Defense outlines mass notification in its *Unified Facilities Criteria (UFC) 4-021-01 Design & O&M: Mass Notification*. It is defined 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."[1]

The UFC recommends the use of a combined fire alarm and mass notification system, 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 system may also be integrated with this combined system.

Initially seen as a "military solution," mass notification systems are becoming more popular among many non-military occupancies. As a result, many authorities continue to reference UFC guidelines for the growing variety of MNS applications outside of the federal government.

Annex E, Mass Notification Systems (MNS) of NFPA 72, *National Fire Alarm Code*, defines MNS as "a system used to provide information and instructions to people in a building area, site or other space using intelligible voice communications and possibly including visible signals, text, graphics, tactile, or other communication methods."[2]

Annex E describes the needs of MNS and how integrating MNS into fire alarm systems makes sense. It also recommends minimum guidelines for system designers, installers and facility managers using MNS.

The Annex is not part of the requirements of NFPA 72, but is included for informational purposes only. It was placed within the Annex because there is a difference between the fire alarm systems impacted by NFPA 72 and emergency notification systems outlined in the UFC. It is important to note that section 6.8.4.7 of the 2007 edition of NFPA 72 does recognize MNS and allows mass notification events to take priority over fire alarm signals.

Applicable Codes & Primary Components

The Department of Defense UFC outlines three primary components of an MNS system as being an autonomous control unit, a notification appliance network and a "Giant Voice" system.

Per UFC guidelines, an autonomous control unit is, "used to monitor and control the notification appliance network and provide consoles for local operation. Using a console, personnel in the building can initiate delivery of pre-recorded voice messages, provide live voice messages and instructions and initiate visual strobe and (optional) textual message notification appliances. The autonomous control unit will temporarily deactivate audible fire alarm notification appliances while delivering voice messages to ensure they are intelligible." In addition, different messages can be broadcast to different areas of the building or campus based on the proximity to the emergency.

A "Notification Appliance Network" is defined as "a set of audio speakers located to provide intelligible instructions at all locations in and around the building. Strobes are also provided to alert hearing-impaired occupants."

The last MNS component indicated in the UFC referred to as the "Giant Voice" or "Big Voice" system, is "typically installed as a base-wide system to provide a siren signal and pre-recorded and live voice messages. It is most useful for providing mass notification for personnel in outdoor areas." Giant Voice systems are meant to alert those within parking lots, campus malls, stadiums, temporary buildings and the like. In the past, massive speaker systems were used in a limited capacity to sound your typical fire or bad weather siren warnings throughout large outdoor areas. Only recently with the rise in demand for MNS, have fire alarm manufacturers begun to develop more powerful speaker clusters to deliver intelligible voice instructions to those outdoors and in the general vicinity of buildings.

The Annex E of NFPA 72 includes guidance for the design and installation of these systems within the growing variety of commercial facilities considering an MNS.

Much like UFC guidelines, the Annex recommends "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 recommends that the MNS should offer a "dynamic library of scripted responses to various emergency events and it would be easily customizable to meet the needs of the individual customer."

Aside from the UFC and Annex E of NFPA 72, the other codes and standards that certain facilities considering an MNS must note are the Americans with Disability Act (ADA), OSHA 1910.165, Employee Alarm Systems, and FEMA's Outdoor Public Alerting Systems.

OSHA 1910.165 applies to "all emergency employee alarms installed to meet a particular OSHA standard." Among other things, the ADA requires strobes to alert hearing-impaired occupants. And FEMA's Outdoor Public Alerting Systems guides warning systems for nuclear power plants.

Complete Solutions for Effective Notification

The Annex E of NFPA 72 plainly defines the priority of MNS as the protection of life by indicating the existence of an emergency situation and instructing the occupants of the necessary and appropriate response and action. With numerous MNS-type products entering the market, it's often a challenge for specifiers to define a particular facility's MNS needs and then move forward with the design of an effective solution.

Per all the aforementioned codes and standards, utilizing the fire alarm control systems for mass notification makes very good sense. Fire alarm systems are supervised and required to be tested and maintained regularly. If a problem occurred that could compromise the system's functionality, the fault would be detected and proper personnel alerted to the condition so they could correct it. Mass notification solutions that are not incorporated into the fire alarm system — PA systems, email, text messaging, and reverse 911 systems — are not subject to stringent codes and standards like fire alarm systems. If such a system should suffer a malfunction that prevents it from working properly, it could potentially go unnoticed and not function when needed.

In the midst of an emergency, flashing strobes accompanied by live or pre-recorded 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. The most effective mass notification systems utilize a combination of audible and visual notification devices, such as strobes, voice communications (indoor speakers and Giant Voice), and programmable LED signage. Incorporating email and text messaging notification into a mass notification system can also be beneficial, however, it should not the sole source of emergency communication.

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 messaging 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 using VoIP.

The marriage of MNS and fire alarm control systems is a growing trend that's expected to continue reaching into larger varieties of facilities and multi-building properties, including K-12 schools, high-rises, mass transit hubs and even public gathering places such as theatres, restaurants and places of worship.

Fire alarm system manufacturers and installers work within a tightly regulated industry in which the federal and local codes and standards serve to promote and preserve life safety for any and every building occupant. Therefore, they have a strong understanding of the mass notification requirements and how their existing products and services compliment the technology.

Endnotes

1. http://www.wbdg.org/ccb/DOD/UFC/ufc_4_021_01.pdf

2. 2007 Edition of NFPA 72, *National Fire Alarm Code*, National Fire Protection Association, Quincy, Massachusetts.