

HOW THE RIGHT MASS NOTIFICATION SYSTEM CAN SAVE LIVES

ROSA LAZEBNIK
PE, REP

JOHN FETTER
PE, REP, LEED GREEN ASSOCIATE

Over the past few decades, there has been a growing recognition of the importance of Mass Notification Systems (MNS) in facilities to enhance the level of life safety. The current definition of MNS stems from the National Fire Alarm and Signaling Code (NFPA 72). The term was first introduced and defined for building owners and design communities in the NFPA 72, 2010 Edition and referred to the system as an Emergency Communication System (ECS). An ECS is used for life protection by indicating the existence of an

emergency situation and communicating information necessary to facilitate appropriate response and action. The need for these systems grew rapidly in the mid-to-late 2000's and the first half of 2010 on university campuses, K-12 schools, hospitals, offices, government facilities, and large venues prone to terrorist attacks. From there, other facilities with a vulnerability to emergency situations were also implementing such systems.



Looking back at the history of MNS, we know that they date back to the Middle Ages when church bells summoned people to worship. Church bells were subsequently used to warn local populations of impending attacks until they were replaced by sirens in the early 1900's. During the Second World War and Cold War, the use of MNS increased dramatically. However, the need for more modern, mass notification can be traced back to June 25, 1996, when terrorists exploded a fuel truck adjacent to an eight-story complex housing U.S. Air Force personnel in Khobar, Saudi Arabia. In all, 19 service members and a Saudi Arabian were killed and another 372 others injured. In a follow-up report, it was determined that casualties could have been drastically reduced if a central emergency notification system had existed on the premises.

Subsequent to these tragic events, the Department of Defense (DoD) developed the document, Unified Facilities Criteria (UFC) #4-021-01 that defined mass notification as "the system with the capability

to provide real-time information and instructions to people in a building, area, site, or installation using intelligible voice communications including visible signals, text, and graphics, and possibly other tactile or communication methods." Most of us will not forget the growing list of catastrophic events that could have used a MNS and remind us of the crucial need for effective emergency response plans: Columbine High School (1999), Virginia Tech Campus (2007), Northern Illinois University Dekalb campus shooting (2008), Aurora, Colorado Movie Theatre (2012), Sandy Hook Elementary School (2012), Umpqua Community College in Oregon (2015), the most recent shooting spree in Nova Scotia, Canada (2020), and more. While the implementation and wide-spread use of an MNS may not entirely prevent these tragedies from occurring, a system compounded with an effective emergency response plan could significantly mitigate the impact of such devastating events and potentially save lives.

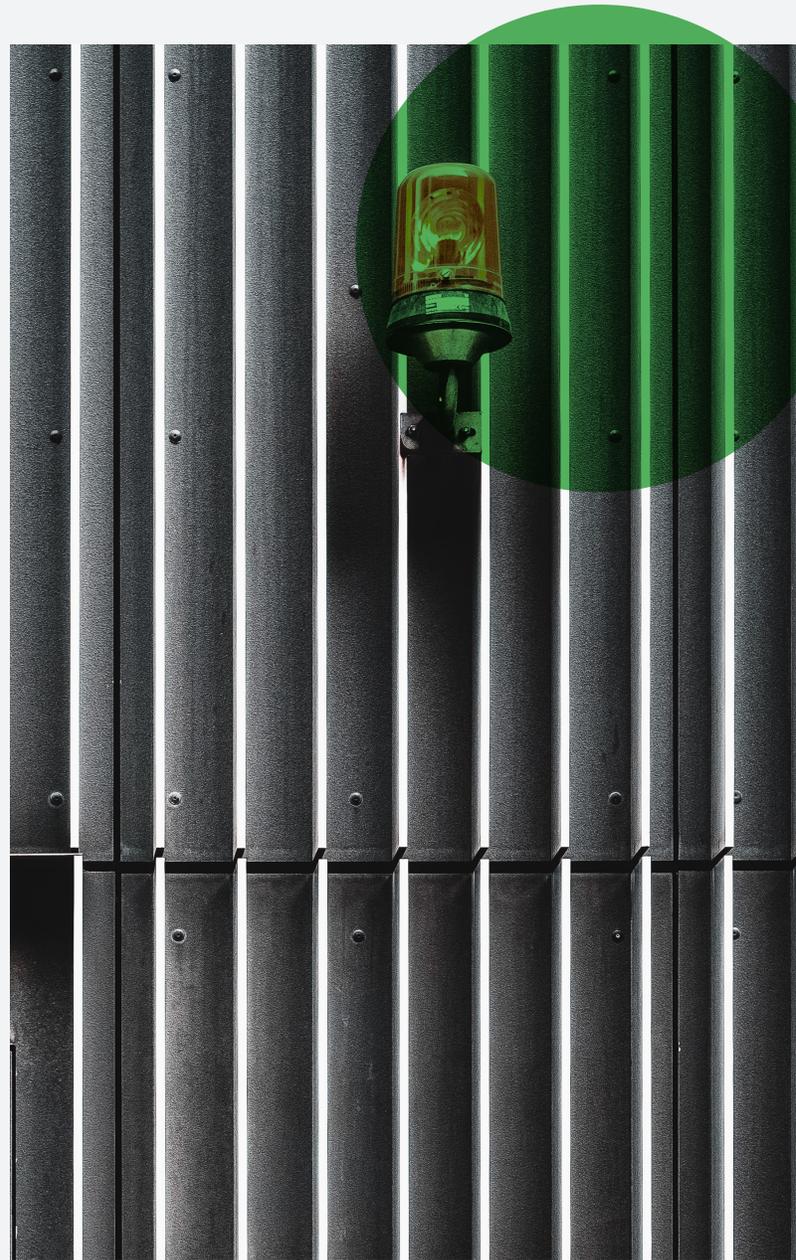
Upgrades to the International Building Code (IBC) and the International Fire Code (IFC) – both essential tools for safeguarding building occupants – include the MNS requirement as a recommended system. Emergency communication requirements are included in the latest edition of the Life Safety Code, NFPA 101-2018. The Life Safety Code addresses many considerations that are fire related and provide communication to occupants under emergency conditions. The code also requires building owners and operators to conduct risk assessments and develop action plans that must be used as a basis of design and implementation of the MNS.

The emergency communication risk assessments and plans are required for new and existing assembly facilities, healthcare occupancies, detention, and educational facilities. For example, risk assessment is now mandatory for new assembly occupancies with an occupant load of 500 or more, to determine if a MNS is required (NFPA 101-2018, art. 12.3.4.5.). In new educational facilities with occupant loads of 100 or more, the Emergency Voice/Alarm Notification System is required (NFPA 101-2018, art. 14.3.4.3). The MNS is permitted to be used for other emergency signaling or for class changes. The fire alarm (FA) system can be utilized as a MNS, but the FA signal shall be distinctive from all other signals.

The emergency action plan will also need to accommodate emergency responses toward unpredictable scenarios, which can be challenging. The emergency action plan shall be developed for each facility when required by the Life Safety Code or Authority Having Jurisdiction. The plan shall include the development of possible scenarios when emergency responses are necessary, procedures for reporting emergencies, occupant and staff required responses during various emergency situations, evacuation, relocation, shelter- in- place procedures, appropriate use of elevators, and the design and conduct of fire and other emergency drills. If occupants and facility management personnel are properly trained on the operations of an emergency response plan, an MNS can be very effective and save lives.

Very often when a MNS is installed, the activation is largely reliant on the discretion of the operator or is subject to an interpretation of the conditions after carrying out a risk. There are some circumstances in which the activation of a MNS will be automatic. For

example, a fire alarm system alarm is activated if a heat sensor or smoke alarm detects a fire. However, in other circumstances there may be an element of doubt (“is that person carrying a firearm?”) in which hesitation could result in unnecessary death or injury. This is when risk assessment and evacuation plans can guide building operators to the best course of action.





A MNS is used to communicate with the public in response to non-fire related threats such as severe weather, a terrorist threat, or an active shooter, using different vehicles to relay messages.

NFPA 101 also determines the scope and format of the risk analysis. An owner will have to determine if, and to what degree, their facility is vulnerable to an emergency. Location, site layout, emergency operations, and demographics of building occupants can all impact the decision, as well as the consideration of regulatory requirements. The installed systems shall conform to all applicable codes and standards. NFPA 72-2019, Chapter 24 covers requirements for indoor and outdoor emergency communication systems. Other codes and standards that should be used as a reference include UL 2572, NFPA 1600 and UFC #4-021-01.

It is not uncommon for MNS to be confused with a fire alarm system. The notification devices in both systems can physically look like one another, they serve a similar purpose, and both systems have the

capability to be programmed as one system. Although both share a similar function in alerting the public to maintain life safety, there are several differences between the two. One fundamental difference is that a fire alarm system primarily focuses on managing building evacuations in the event of a fire. On the contrary, a MNS is used to communicate with the public in response to other non-fire related threats such as severe weather, a terrorist threat, or an active shooter. Unlike a fire alarm system where the primary function is to evacuate the building, evacuation may not always be the best course of action for every emergency and may even be ill-advised depending on the nature of the threat. MNS can annunciate a fire alarm, but they also need to be able to suppress the alarm in a non-fire emergency such as an active shooter situation.



For example, in circumstances where there is a gunman on campus, students and faculty are typically advised to remain inside on lockdown until the area is deemed safe. Other situations where evacuation may not be recommended could include a severe weather alert, such as a tornado warning, where people are advised to seek shelter. Another difference between a fire alarm and an MNS is that in an MNS the delivered message must be intelligible as opposed to audible horns (even though modern fire alarm systems do use intelligible voice communication instead of horns). The requirement for intelligibility is stated in NFPA 72-2018 Edition, Chapter 24 “Emergency Communications Systems,” which states that the

message be comprehensive and clearly understood. Also, per NFPA 72, the message used in an MNS must be provided in real-time and include actionable information. Technology-based intelligible message systems can be used to send out warning messages that inform the general public of a situation and provide guidance as to the best course of action. For example, the location of risk or hazard, authorities in charge of the situation, and/or a possible timeline for resolution may be indicated within the message. This information can be significantly beneficial in aiding people during an emergency where the recommended action is something other than evacuation.

Tactile or other communication methods, including text messaging, email, instant messaging, social media, or other voice services, may also be used. Voice service refers to telephones, cell phones, VoIP, and outdoor and indoor public address systems, among others.

It is also important to note that the two-way communication capability in the system provides great benefits in emergency situations because of the public's ability to notify the emergency response team in real time, which tremendously improves coordinated efforts to respond to the situation.

Mass Notification Systems are designed to provide real-time information and instructions to the occupants of a single building, university campus or even an entire city. It is important to mention that, per NFPA 72, the MNS should be integrated and consist of four layers. It is not necessary for every MNS to have all the elements within each of the four layers, but it is important that the elements are integrated with each other, so they are all transmitting the same message. The four layers defined by NFPA 72 are:



Layer 1: Immediate and Intrusive Alerting

- One-way voice communication system
- Two-way voice communication system
- Visible notification appliance(s)
- Textual/digital signage and displays

Layer 2: Wide Area

- Wide area outdoor notification system

Layer 3: Distributed Recipient Notification System

- SMS Text/Email
- Computer pop-ups
- Smartphone apps
- Reverse 911

Layer 4: Public Alerting

- Radio & TV broadcasts
- Social Media

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In summary, the desire for increased measures to protect life safety through the use of Mass Notification Systems has grown significantly in recent years. Contributing to this increase in demand is the availability of communication technologies providing real-time situational awareness to the public, thus protecting lives and property. Additionally, the increasing number of threats and catastrophic events compounded with people placing a much-needed premium on maintaining life safety, have all contributed to the popularity of MNS. The Center for Campus Fire Safety, which is the nation's leading resource for public fire and life safety education on college campuses, recently conducted a survey and determined that the majority of university executives were in favor of advancing and implementing MNS

on their campuses. As such, the efforts of Center for Campus Fire Safety and other similar organizations led to the inclusion of Mass Notification Systems in the Life Safety Code (NFPA 101) and NFPA 5000 for educational and other occupancies. The requirement of a risk analysis for all occupancy classifications is now included in NFPA 101 and NFPA 5000.

Owners can greatly benefit from hiring consultants to conduct risk assessments to determine the need for an MNS. Once the decision is made, the consultant can help the owner determine the most efficient approach to the system design based on available funding, infrastructure, and risk management goals. Existing communication technology can also be leveraged for emergency communication. For example, TV and computer monitors in lobbies with high traffic areas can be overridden and used as digital signage to display messages during an emergency. With just a few adjustments, PA systems can also be supervised and incorporated into an MNS. Finally, NFPA 72, building codes, and select municipalities allow fire alarm and MNS to be integrated together as one comprehensive system. The benefits of having a Mass Notification System outweigh the alternative and should not be underestimated. With the right approach, the implementation of a Mass Notification System can be an easy and seamless process that should be considered in any situation.

ABOUT THE AUTHORS



Rosa Lazebnik, PE, REP

ENGINEERING DIRECTOR, *BUILDINGS DIVISION*

Rosa Lazebnik is Primera's resident electrical engineering expert. Her expertise is a result of more than 40 years of experience in the design of complete electrical systems for new and remodeled building construction with numerous applications including hospitals, higher education, transportation, retail, museums, and laboratory research facilities. She has extensive experience in handling projects in campus environments.



John Fetter, PE, REP, LEED Green Associate

ELECTRICAL ENGINEER, *BUILDINGS DIVISION*

John Fetter is one of Primera's resident electrical engineering experts. His expertise is the result of more than 15 years of experience with designing power distribution, lighting, fire alarm, communication systems, and lightning protection for several different building types. His work includes hospitals, schools, nursing homes, high rise residential, office buildings, restaurants, retail, and correctional facilities. John has also worked as a Project Coordinator overseeing projects from their design stage to final construction.