Mass Notification Systems: Approaching Critical Mass

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Mass Notification System ideology and requirements have been slowly making their way into the mainstream of governmental/military and commercial construction projects in recent years throughout the U.S. This trend follows the latest 2008 updates of the Department of Defense (DoD) mass notification criteria, which was originally initiated by the 1996 Khobar Towers bombing and subsequent increasingly stringent anti-terrorism protection requirements now contained within a multitude of DoD Unified Facilities Criteria documents. Also, the trend follows the escalation of intensified Department of Education and Congressional mandates, most recently enacted via the 2008 Higher Education Opportunity Act, which included amendments to the Clery Act, updating higher educational institutions' criteria for emergency incident reporting to the student body. These major trends are due in large part to the "War on Terror," and a response to school shootings and other security related incidents. Both of which have grasped national attention for the last decade.

NFPA-2007 EDITION

The National Fire Protection Association's *NFPA 72 National Fire Alarm Code* first included Mass Notification System recommendations within the 2007 Edition, as an entirely new "Annex E." This annex, as typical of all other NFPA annexes, was provided for informational purposes only. Therefore, even though most U.S. jurisdictions adopt NFPA 72 as part of their local building code, along with specific jurisdictional amendments after each new edition is released, only the main body chapters of the NFPA Standard are considered the codified requirements, unless specific jurisdictional amendments dictate otherwise.

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Still, the inclusion of Mass Notification System Annex recommendations into the *National Fire Alarm Code* has served to solidify the general agreement that mass notification systems should meet the same stringent physical survivability, performance integrity, and self-monitoring/supervision requirements as fire alarm systems, and could even be fully or partially integrated with fire alarm systems to become coordinated, multi-functional, emergency communications systems. This added annex material set the groundwork for the landmark changes that were to come.

WIDENING THE SCOPE

When the latest 2010 Edition of NFPA 72 was recently released with the addition of Chapter 24 *Emergency Communications Systems (ECS)* to the Standard's body requirements, these major scope changes were reflected in a new document title: *NFPA 72 National Fire Alarm and Signaling Code*. Thus demonstrating the recognition that the scope is now well beyond fire alarm and detection. Mass notification system requirements are now based in the ECS chapter and it is just a matter of time until jurisdictions officially adopt this latest 2010 Edition of NFPA 72.

From the overall perspective of the design philosophy behind mass notification systems, much of the earlier 2007 Edition annex recommendations, and governmental military-based methodologies, have not been significantly changed within the new body requirements of '10 NFPA 72 . But, the National Fire Protection Association needed a new way to provide mass notification design and installation requirements. They needed a system that could be applied not only to a broad range of building construction types, occupant types, and business functions/operations--as the prescriptive (value-based) parameters of NFPA 72 had in earlier editions for only fire-related emergency scenarios--but they had also had to consider every other imaginable emergency scenario as well. This included the possibility of multiple types of emergency scenarios, each associated with potentially conflicting occupant instructions, occurring simultaneously. Major categories of emergency events under which there are a large range of potential emergency scenarios for consideration, include:

- Severe weather
- Terrorism
- Criminal
- Health/medical
- Geological
- Utility service disruption

When thinking about the depth and breadth of the task of providing specific prescriptive requirements to adequately cover every possible scenario, the sheer magnitude and complexity of the task of creating such requirement parameters seems utterly impossible. It quickly becomes apparent that a set of performance-based guidelines leading to a facility-specific emergency communications system or mass notification system master plan should be created to, in essence, becoming a facility's own customized Standard or "Code." Then, by adding requirements for early planning-stage input, review, and approval by the local Authority Having Jurisdiction (AHJ) to reduce the risks often-times associated with the performance-based approach, this approach becomes the obvious solution.

NO LONGER AN OPTION

In the past, performance-based designs which strayed from the prescriptive word-of-the-Code were allowed as an alternate option "... with AHJ approval", as found in many Standard/Code sections succeeding the value-based requirement. But, this option was rarely considered by designers, let alone allowed by most AHJs, unless an acute project-specific issue was uncovered that forced the two parties to work together on some type of equivalency or performance-based tradeoff in order to not comply with the intent of the Code. Now, not as an alternate option but as a primary requirement, the latest 2010 Edition of NFPA 72 dictates the following for in-building mass notification systems:

(NFPA 72: 24.4.2.2 & 24.4.2.3)

- Each application of a mass notification system shall be specific to the nature and anticipated risks of each facility for which it is designed.
- The designer shall consider both fire and non-fire emergencies when determining risk tolerances for survivability for the mass notification system.
- Performance-based design and the risk analysis shall be applied in accordance with Section 24.7 [of this Standard].
- The risk analysis shall be used as the basis for development of the emergency response plan.
- A well-defined emergency response plan shall be developed in accordance with NFPA 1600, *Standard on Disaster/Emergency Management and Business Continuity Programs*, and NFPA 1620, *Recommended Practice for Pre-Incident Planning*, as part of the design and implementation of a mass notification system.

Furthermore, the typical fire alarm system type of comprehensive record documentation is required for delivery to the Owner or Owner's Representative upon final acceptance of all mass notification systems, along with the newly required risk analysis-based emergency response plan, as indicated in the excerpts above. This emergency response plan record documentation must include, at a minimum, operational management procedures defined for activation and management of the system.

GOALS & OBJECTIVES

The mass notification system design and associated design elements, necessary for the system to continue to meet the AHJ approved performance-based goals and objectives, are required to be maintained for the life of the building. The performance-based design goals and objectives, as required by '10 NFPA 72, are as follows:

(NFPA 72: 24.7.1)

- The risk analysis, design criteria, design brief, system performance, and testing criteria are developed in the spirit of chapter 24 *Emergency Communications Systems (ECS)*.
- The system disseminates information to the target audience in an accurate and timely manner.
- The design and performance criteria are specific to the nature and anticipated risks of each location.
- The system is capable of withstanding various scenarios and survives even if some damage has already occurred.
- Message initiation can be effected by all responding entities responsible for the safety and security of occupants.

All mass notification system designs are required to meet the above goals and objectives. The systems are considered compliant/equivalent provided that: The design's performance criterion includes "timely and accurate notification of all persons within the boundaries of the mass notification system in a medium to which they can respond when given directions by responding entities"; the design team concurs with the design and is comprised of the licensed design professional, the owner or owner's representative, representatives of the AHJ, and representatives of the responding entities (e.g., fire department personnel, security guards, police, military, etc.); and the risk analysis considers the following factors:

(NFPA 72: 24.7.6 & 24.7.7)

- Number of persons to be notified and extent of notification
- Occupancy characteristics
- Anticipated threats
- Staff capabilities and system effectiveness
- Coordination with the emergency response plan

For further '10 NFPA 72 qualification requirements and associated annex recommendations, one may refer to sections 24.7.2 & A.24.7.2. These sections contain information on the pertinent areas of expertise of the aforementioned mass notification system performance-based design team's licensed design professional. An experienced, licensed, design professional is strongly recommended in order to correctly implement Mass Notification System Performance-Based Designs, Emergency Response & Strategic Master Planning, and Risk Analyses. The services of a professional engineer of fire protection engineering are typically sought-out to guide this multi-faceted process from conception to design completion and beyond.

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