



CAMPUS FIRE SAFETY CODE TALK

Campus Fire Safety e-NewZone

MULTI-PHASED FIRE ALARM AND MASS NOTIFICATION SYSTEM UPGRADES:

The Authority Having Jurisdiction (AHJ) and Proper Planning

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Planning and executing a multi-phased campus-wide upgrade to a fire alarm system and/or to an emergency communications system, such as a mass notification system (MNS), represents a major challenge for all stakeholders; especially for the authority having jurisdiction (AHJ) with the responsibility of approving and commissioning such system upgrades.

This article discusses a number of technical provisions in NFPA 72®, *National Fire Alarm and Signaling Code*®, 2013 edition; relevant to new technologies, research and recommendations made to AHJs to better address the integration of mass notification and other systems with campus-wide fire alarm systems. For illustration purposes, a few case scenarios are examined.

Why is so important to get it done and to get it right?

When an emergency arises in a campus environment, it is crucial to properly notify authorities and first responders, as well as students, faculty, staff and visitors. Such notifications should be provided in a timely and comprehensive fashion in order to expedite and optimize response actions; a mass notification system is one of the best methods to accomplish such a task.

There are many ways of providing a mass notification system. One of the most cost-effective solutions is using the existing fire alarm system as a backbone and making the necessary upgrades to handle the requirements and capabilities of mass notification.



Proper planning and open-trustful communications will help to get it done right. Failure to provide timely and comprehensive notifications by poorly designed systems, or during any particular phase, could create a false sense of fire and life safety that adversely impact the safety of all occupants.

How can it be achieved?

The complexity of a campus-wide fire alarm system and its mass notification features requires extensive planning and considerable efforts and resources. Upgrades on such complex systems are usually performed in multiple stages or phases that may lapse from a few months to several years. Therefore, multi-phased projects are a common denominator when dealing with campus-wide fire alarm and mass notification system upgrades.

An important challenge in such projects is gaining support and approval from the AHJ. Open communications between all stakeholders, especially between design engineers and the AHJ, is crucial for proper planning and project execution. Generally speaking, design engineers will develop plans and specifications describing HOW the systems will operate in compliance with current code requirements and industry standards. The AHJ will be responsible for the acceptance criteria and final commissioning. But, resource limitations, and even occupancy management, will usually limit the amount of work that can be performed on a specific building, or a section of the campus, during any given period of time; therefore, establishing the WHEN can the work be performed.

In some cases, specific areas, such as computer rooms or dormitories, can be tackled simultaneously throughout the whole campus; while in other scenarios only particular buildings, or areas within a building, will be available for the installation crews to perform the work. It will depend on each campus, their buildings occupancy, how the risk and hazards are prioritized and, on the conditions and features available on the existing fire alarm and/or mass notification system.

Another possibility is to split project phases based on specific mass notification components, such as, in-building, wide-area and/or distributed recipient components, as centralized control units may be able to handle multiple buildings or campus areas.

Code Requirements and Recommendations¹

¹ Additional Code references may be required by the Authority Having Jurisdiction (AHJ) or Municipality. Therefore, the herein mentioned Codes are not intended to be an all-inclusive list. Consult your local Codes and the AHJ for specific requirements.



In order to identify where a fire detection system is required, and how the system should operate and interface with other systems, the following references should be considered:

- ▶ NFPA 101®, *Life Safety Code*®, 2015 edition,
- ▶ NFPA 72®, *National Fire Alarm and Signaling Code*®, 2013 edition and/or, other
- ▶ Applicable building and fire codes, such as, the International Building Code (IBC) and the International Fire Code (IFC).

The 2015 edition of NFPA 101®, *Life Safety Code*®, or the specific building code adopted in the jurisdiction, will determine WHERE the fire alarm and mass notification systems will be required based on the building occupancy and if the project will take place in new or existing buildings.

The 2013 edition of NFPA 72®, *National Fire Alarm and Signaling Code*®, will help establish HOW the initiating devices, notification appliances and other components are to be selected, HOW their installation needs to be performed and, applicable inspection, testing and maintenance procedures. Chapter 24 covers the application, installation, and performance of emergency communications systems and their components, including mass notification. This chapter applies to emergency communications systems within buildings and outdoor areas. Operating principles and performance criteria are also discussed in Chapter 18 and Annex A includes additional explanatory information.

As per Paragraph 24.3.11, a proper risk analysis will also need to be performed. The risk analysis will describe each area to be protected, identify anticipated hazards and risk, recommend fire detection and notification elements, as well as reference the applicable codes and standards.

How the NFPA 72®, 2013 edition changed to address these needs?²

Significant revisions were made in the NFPA 72®, 2013 edition, to reflect the broader application of the Code to emergency communications systems. These changes included the following:



- ▶ A completely new Chapter 7, Documentation Chapter; has been added to improve the overall usability of the document.
- ▶ Chapter 10, Fundamentals Chapter; to address power supply requirements, signal priorities and signal distinction requirements.
- ▶ Chapter 23, Protected Premises Chapter; to better accommodate non–fire alarm systems and combination systems.
- ▶ Chapter 26, Supervising Station Chapter and Chapter 27 Public Emergency Alarm Reporting System Chapter; to permit their use for emergency communications systems, and
- ▶ Chapter 14, Inspection, Testing and Maintenance Chapter; to incorporate requirements for the inspection, testing, and maintenance of mass notification systems and two-way radio communications enhancement systems.

² Changes listed are only those related to emergency communications systems and mass notification. The NFPA 72, 2013 edition also includes multiple updates on other sections not related to this article's main topic.



C+S and more

HOW?

- Construction Specs need to be Code Compliant
- NFPA 101-2015
- NFPA 72-2013
- AHJ
- National/Local Acceptance Criteria

HOW?

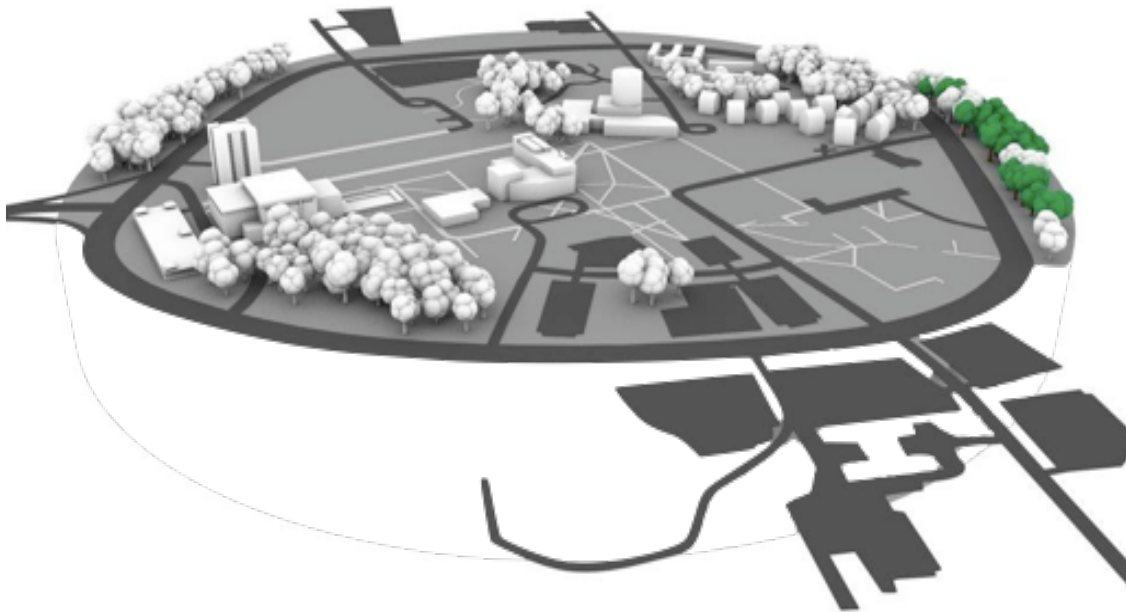
- On a Building by Building case or,
- By Hazardous Areas (i.e. Labs, Computer Rooms) for the entire campus or,
- As approved by the AHJ

HOW?

- By MNS components:
 - In Building Systems
 - Wide-Area Systems
 - Distributed Recipient Systems

HOW?

- By a Team Effort, with Open Trustful Communications and,
- By Compromise to Achievable and Safe Milestones.



If you don't have a good grip on HOW to get it done, don't Do It! It's OK to request more information (i.e. additional coordination drawings, meetings, inspections and/or additional phases)



Case Scenarios

As previously discussed, selection of project phases and scope will involve multiple elements and the commitment of all stakeholders; let's look at a few case scenarios and summarize the main elements to consider when determining if a project, or a selected phase, should move forward or, if additional steps are required.

Example 1: One Building - MNS upgrade in multiple phases

		ROOF			MECH/EMR
	6TH				LIBRARY
	5TH				LIBRARY
4 TH					LAB/CLASS RM
3 RD					LAB/CLASS RM
2ND					LAB/CLASS RM
1ST					LOBBY/CONF RM

What to consider: Some floor renovations may be done in different years
 Elements affecting audibility/intelligibility such as:
 Variety of finishing materials
 Ceiling heights
 Peripheral offices
 Code regulations may change every 3 to 5 years

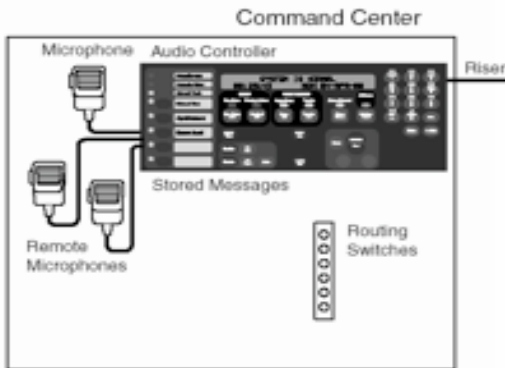
Example 2: Multiple Buildings - MNS upgrade in multiple phases - Upgrades Based on System Components

What to consider: Master planning required
 Single versus multiple manufacturers
 Head-end components may need to be upgraded first
 Compatibility issues:
 Between control units and field devices
 Between network control units and local control units
 Code regulations may differ based on occupancy
 Code regulations may change every 3 to 5 years

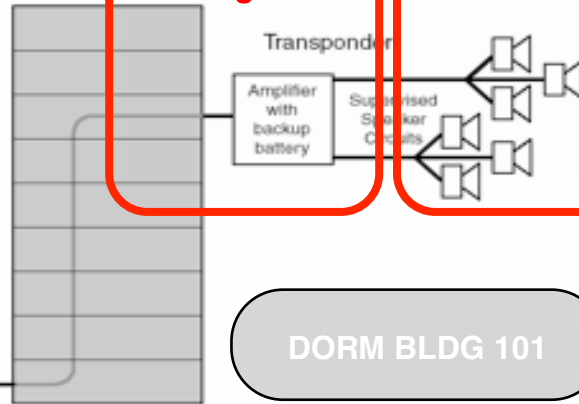


C+S and more

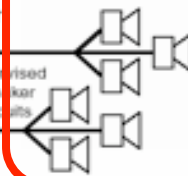
PHASE I: Head End Fire Alarm/MNS Panels Upgrade



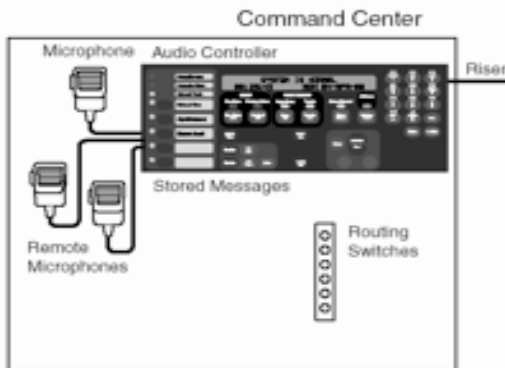
PHASE II: Transponders



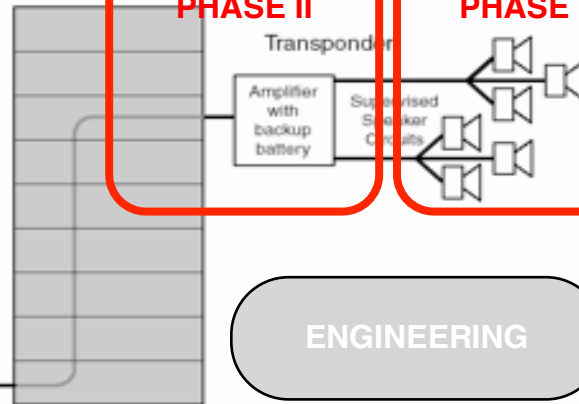
PHASE III: Peripherals



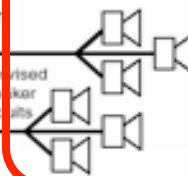
DORM BLDG 101



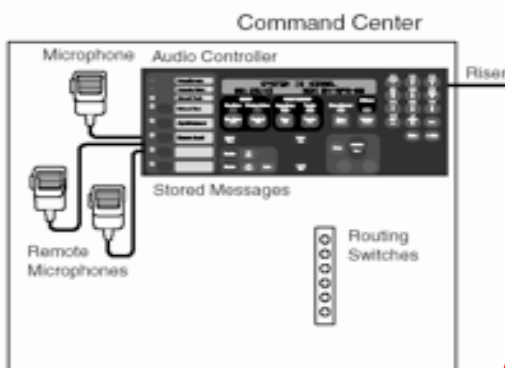
PHASE II



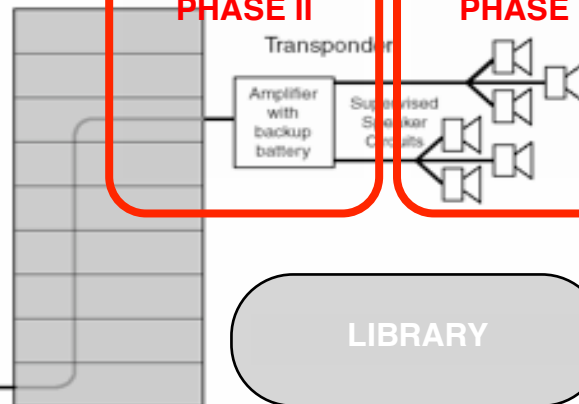
PHASE III



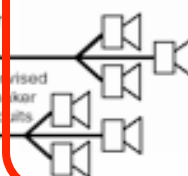
ENGINEERING



PHASE II



PHASE III



LIBRARY



In order to select proper fire alarm and mass notification components, and to establish their expected coverage, extensive research and coordination with multiple manufacturers is commonly required. Components must be evaluated for the specific application, and capabilities and limitations must be compared against their datasheets and installation manuals. Validation of equipment and components performance can be requested from the manufacturer or listing agencies such as FM Global, Underwriters Laboratories (UL) and others.

Having the authority having jurisdiction's (AHJ) input and contribution early on the design and installation phases is essential to project success.

To conclude, it is essential to recognize the multiple challenging factors and the specific risks associated with implementing an upgrade project lapsing multiple phases, and possibly, over long periods of time. On a case by case basis, proper selection of system components and applicable means and methods need to be reviewed and coordinated with the AHJ and other trades. Accuracy on WHEN and HOW each phase is approved and commissioned are key elements to reduce unnecessary risk while providing achievable goals and expectations.



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www.campusfiresafety.org