

Learn About the Code

NFPA 72- 2010

*National Fire Alarm **and Signaling**
Code*



**SILENT
KNIGHT**

by Honeywell

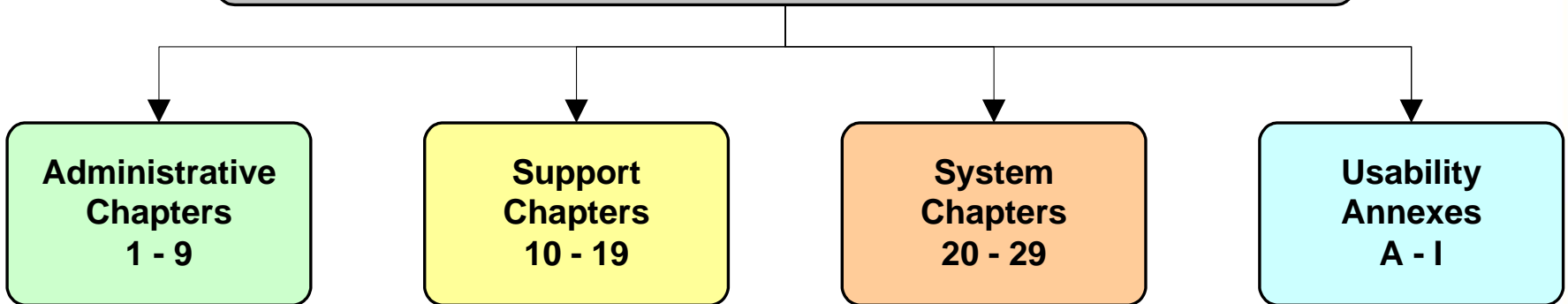
National Fire Alarm and Signaling Code

- **Objectives:**
- Introduce the new structure of the *National Fire Alarm and Signaling Code*, NFPA 72-2010.
- Provide an overview of key changes to the new Code including **three new chapters**: 12, 21, & 24 and Their Design Impact.
- Introduction to Risk Analysis and Its Application to MNS Design.

NFPA 72- 2010 *National Fire Alarm and Signaling Code*

The title change recognizes that NFPA 72 addresses signaling systems used for more than just *fire* hazards. Systems used for weather alerts and warnings, terrorist attacks, chemical releases and other threats are now directly incorporated in NFPA 72.

NFPA 72 National Fire Alarm and Signaling Code



- Structural changes aimed at making the Code easier to navigate and easier to grow in the future.
- 29 Chapters, only 14 are being used in the 2010 edition.
 - This allows for future changes and expansion without having to relocate existing text.
- These 14 chapters represent the 11 chapters of the 2007 edition plus three new chapters.

National Fire Alarm and Signaling Code

NFPA 72 - 2010

Administrative Chapters

1 - 9

1. Administration
2. Referenced Publications
3. Definitions
4. Reserved
5. Reserved
6. Reserved
7. Reserved
8. Reserved
9. Reserved

Support Chapters

10 - 19

10. Fundamentals
11. Reserved
12. Circuits and Pathways
13. Reserved
14. Inspection, Testing, and Maintenance
15. Reserved
16. Reserved
17. Initiating Devices
18. Notification Appliances
19. Reserved

System Chapters

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20. Reserved
21. Emergency Control Functions and Interfaces
22. Reserved
23. Protected Premises Fire Alarm Systems
24. Emergency Communications Systems
25. Reserved
26. Supervising Station Alarm Systems
27. Public Emergency Alarm Reporting
28. Reserved
29. Single- and Multiple-Station Alarms and Household Fire Alarm Systems

Usability Annexes

A - I

- A. Explanatory Material
- B. Engineering Guide for Automatic Fire Detector Spacing
- C. System Performance and Design Guide
- D. Speech Intelligibility
- E. NEMA SB 30, Fire Service Annunciator and Interface
- F. Sample Ordinance Adopting NFPA 72
- G. Informational References
- H. Cross-Reference Table
- I. Index

Chapter 3 – Definitions

Over 70 New Definitions –
Most to Accommodate
Chapter 24 – ECS
and Chapter 18 Notification
Appliances

Three New Chapters

- Chapter 12, *Circuits and Pathways*
- Chapter 21, *Emergency Control Functions and Interfaces*
- Chapter 24, *Emergency Communications Systems*

Chapter 10 - Fundamentals

■ 10.4.2 System Installer.

■ 10.4.2.1

Fire alarm systems and emergency communication systems installation personnel shall be qualified or shall be supervised by persons who are qualified in the installation, inspection, and testing of the systems.

■ Under 10.4.2.2 item number 3

Personnel who are factory trained and **certified** for fire alarm system installation and emergency communication system installation of the specific type and brand of system and who are acceptable to the authority having jurisdiction.



Farenhyt PHD training course

Chapter 10 - Fundamentals

- New section 10.5.6.3.1 (1) (under *Capacity*) states that:

“Battery calculations shall include a 20 percent safety margin to the calculated amp-hour rating.”

- 10.5.9.1.2. The new section now states:

“Where the battery is not marked with the month/ year by the manufacturer, the installer shall obtain the date code and mark the battery with the month/year of battery manufacture.”

Chapter 10 - Fundamentals

- **10.6 Signal Priority.** The priority of signals shall be in accordance with Section 10.6.
- **10.6.1** ECS priority signals when evaluated by stakeholders through a risk analysis in accordance with 14.4.2.2 shall be permitted to take precedence over all other signals.
- **10.6.2** Fire alarm signals shall take precedence over all other signals, except as permitted by 10.6.1 or 10.6.3.

Chapter 10 - Fundamentals

- **10.6.3*** Emergency mass notification signals and messages shall be permitted to have priority over fire alarm notification signals in accordance with the requirements of Chapter 24.

Chapter 12 – Pathway Interconnections

- 12.2 General.

12.2.1 This chapter describes the performance and survivability characteristics for defined class designations of signaling paths (interconnections).

No More Circuit Styles!

Chapter 12 – Pathway Interconnections

12.2.2 A path's (interconnection's) class designation is dependant on the path's (interconnection's) capability to continue to operate during specified fault conditions.

12.2.3 The designation of the paths can also include the performance of the path (interconnection) to survivability from attack by fire.

Chapter 12 – Pathway Interconnections

- Six Pathway Class Designations
 - A
 - B
 - C
 - D
 - E
 - X
- Class Depends On
The Pathway Performance

Chapter 12 – Pathway Interconnections

- Class A*. A pathway with a redundant path. Operational capability continues past a single break. Conditions that affect the intended operation of the path are annunciated.
- Class B. A pathway without a redundant path. Operational capability stops at a break. Conditions that affect the intended operation of the path are annunciated.

Chapter 12 – Pathway Interconnections

- Class C. One or more pathways where operational capability is verified via end-to-end communication, but the integrity of individual paths is not monitored. A loss of end-to-end communication is annunciated.
- Class D. A pathway that has fail-safe operation, where no fault is annunciated, but the intended operation is performed instead.

Chapter 12 – Pathway Interconnections

- Class E. A pathway which is not monitored for integrity.
- Class X. A pathway with a redundant path. Operational capability continues past a single break or short-circuit. Conditions that affect the intended operation of the path are annunciated.

Survivability Not Defined in Chapter 3 – Performance Description in Chapter 24

- Section 24.4.1.8.4.1 states, “Fire alarm systems used for partial evacuation and relocation shall be designed and installed such that attack by fire within an evacuation signaling zone shall not impair control and operation of the notification appliances outside the evacuation signaling zone.” This is the performance description of survivability. Designers, authorities having jurisdiction, and installers should also ensure that circuits controlling notification appliance circuits and equipment that are common to more than one evacuation signaling zone be designed and installed such that the fire will not disable them.

Chapter 12 – Pathway Interconnections

- Survivability has also been assigned "levels" in recognition that one size does not fit all.
- Survivability Levels
 - 0
 - 1
 - 2
 - 3

Chapter 12 – Pathway Interconnections

- Pathway Survivability Level 0
 - Pathways shall comply with the requirements of NFPA 70 Articles 760, 770 or 800

Chapter 12 – Pathway Interconnections

- Pathway Survivability Level 1
 - Pathways in buildings fully protected by an automatic sprinkler system in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems and with the interconnecting wiring or cables installed in metal raceways

Chapter 12 – Pathway Interconnections

- Pathway Survivability Level 2 must consist of the following:
 - a. 2-hour fire rated circuit integrity (CI) cable or,
 - b. 2 hour fire rated cable system (electrical circuit protective system) or,
 - c. 2-hour fire rated enclosure or protected area or,
 - d. 2-hour performance alternatives approved by the authority having jurisdiction

Chapter 12 – Pathway Interconnections

- Pathway survivability Level 3 shall consist of the following:
 - a, b, c, d. All options are the same as Level 2 but the pathways are in buildings fully protected an automatic sprinkler system in accordance with NFPA 13.

Pathway Survivability

- Each Level of pathway survivability offers options for the designer and installer to meet the survivability requirements. There has been confusion in the past where some users of the Code assumed that if a circuit was in conduit it was survivable. Wire or cable in a raceway such as conduit is certainly mechanically protected but is not survivable from the impact of fire.

Chapter 14 – Inspection, Testing and Maintenance

- The system documentation requirements have been expanded to include two new sections related to software:
- **14.2.4.1** The provided documentation shall include the current revisions of all fire alarm software and the revisions of software of any systems with which the fire alarm software interfaces.
- **14.2.4.2** The revisions of fire alarm software, and the revisions of the software in the systems with which the fire alarm software interfaces, shall be verified for compatibility in accordance with the requirements of 23.2.2.1.1.

Chapter 14 – Inspection, Testing and Maintenance

- **14.2.8* Performance-Based Inspection and Testing.** As an alternate means of compliance, subject to the authority having jurisdiction, components and systems shall be permitted to be inspected and tested under a performance-based program.
- The section as written allows alternative means of compliance for system inspection and testing to be submitted to the AHJ for review and approval.

Chapter 14 – Inspection, Testing and Maintenance

For the first time, voice intelligibility is required to be verified:

- **14.4.13* Voice Intelligibility.** Voice communication using prerecorded messages and manual voice announcements shall be verified as being intelligible in accordance with the requirements of 18.4.10.

Chapter 14 – Inspection, Testing and Maintenance

Notice however that the requirement does NOT require any form of testing. Essentially if the recorded messages can be understood during the testing, the system should pass.

Initiating Devices

Location and Spacing – Smoke Detectors

- **17.7.3.1.4** If the intent is to initiate action when smoke/fire threatens a specific object or space, the detector shall be permitted to be installed in close proximity to that object or space.



Initiating Devices

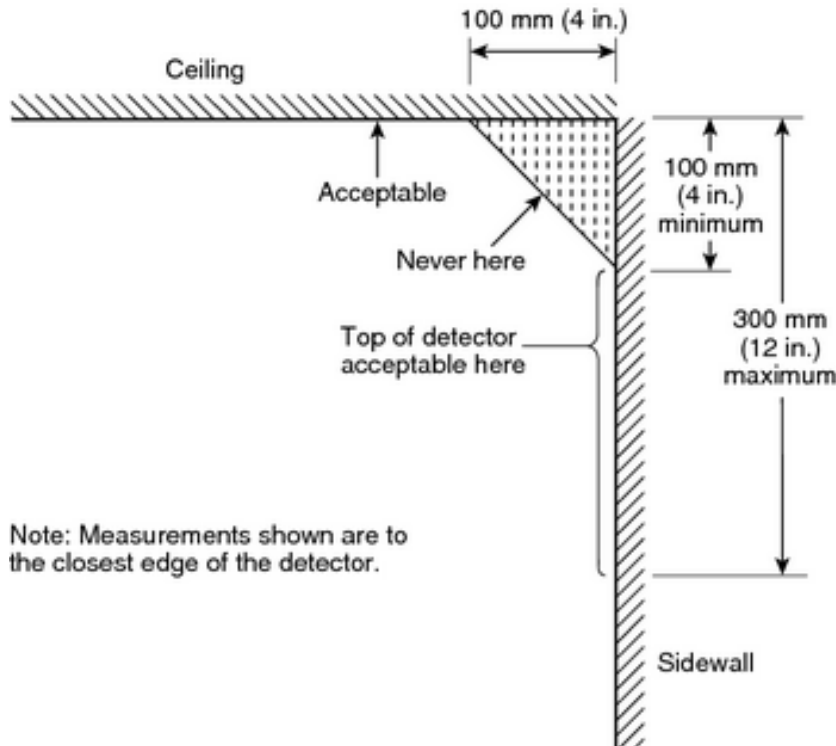
□ 17.7.3.2 Spot-Type Smoke Detectors

□ 17.7.3.2.1 Spot-type smoke detectors shall be located on the ceiling or, if on a sidewall, between the ceiling and 12 in. (300 mm) down from the ceiling to the top of the detector.

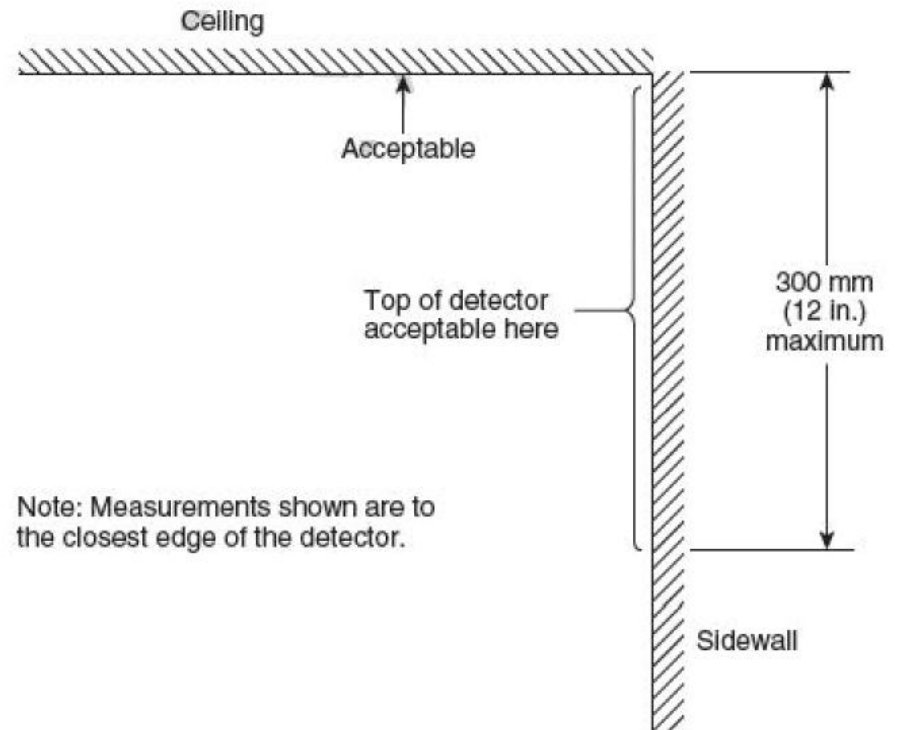
□ *The 4 inch restriction has been removed.*

Spacing of Smoke Sensors

72-2007



72-2010



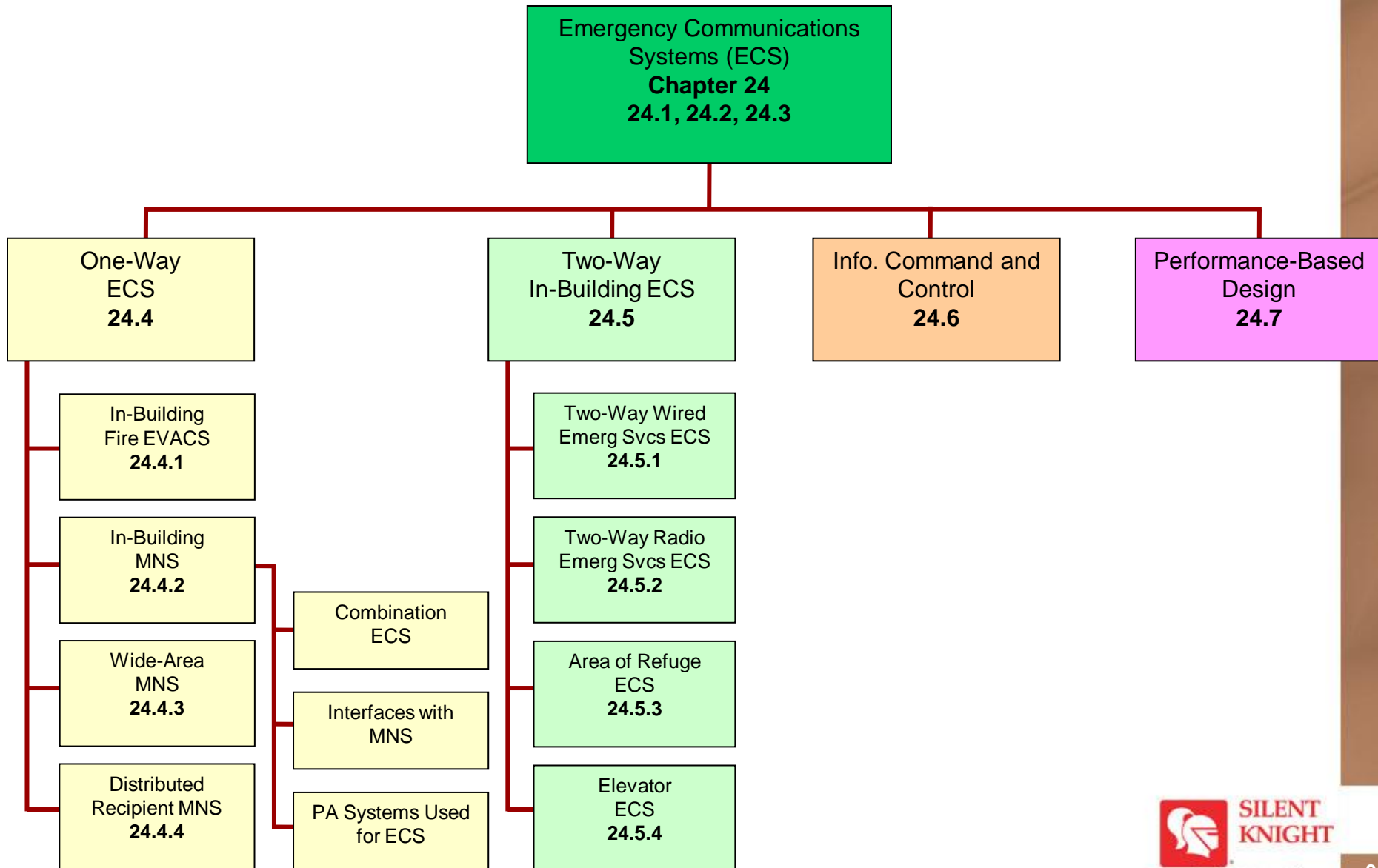
Chapter 21 - EMERGENCY CONTROL FUNCTIONS AND INTERFACES

- 21.3 Elevator Recall for Fire Fighters' Service.
- 21.4 Elevator Shutdown.
- 21.5 First Responders Use Elevators.
- 21.6 Elevators for Occupant-Controlled Evacuation.

Chapter 21 - EMERGENCY CONTROL FUNCTIONS AND INTERFACES

- 21.7 Heating, Ventilating and Air-Conditioning (HVAC) Systems.
- 21.8 Door Release Service.
- 21.9 Electrically Locked Doors.
- 21.10 Exit Marking Audible Notification Systems.

NFPA 72 - Chapter 24 ECS Organization



Chapter 24

Overview of Key Issues

- System Design
 - Audibility
 - Intelligibility
 - Survivability
 - Relevance
 - Risk Analysis
 - Threat Assessment
 - Emergency planning

MNS Role in Emergency Planning

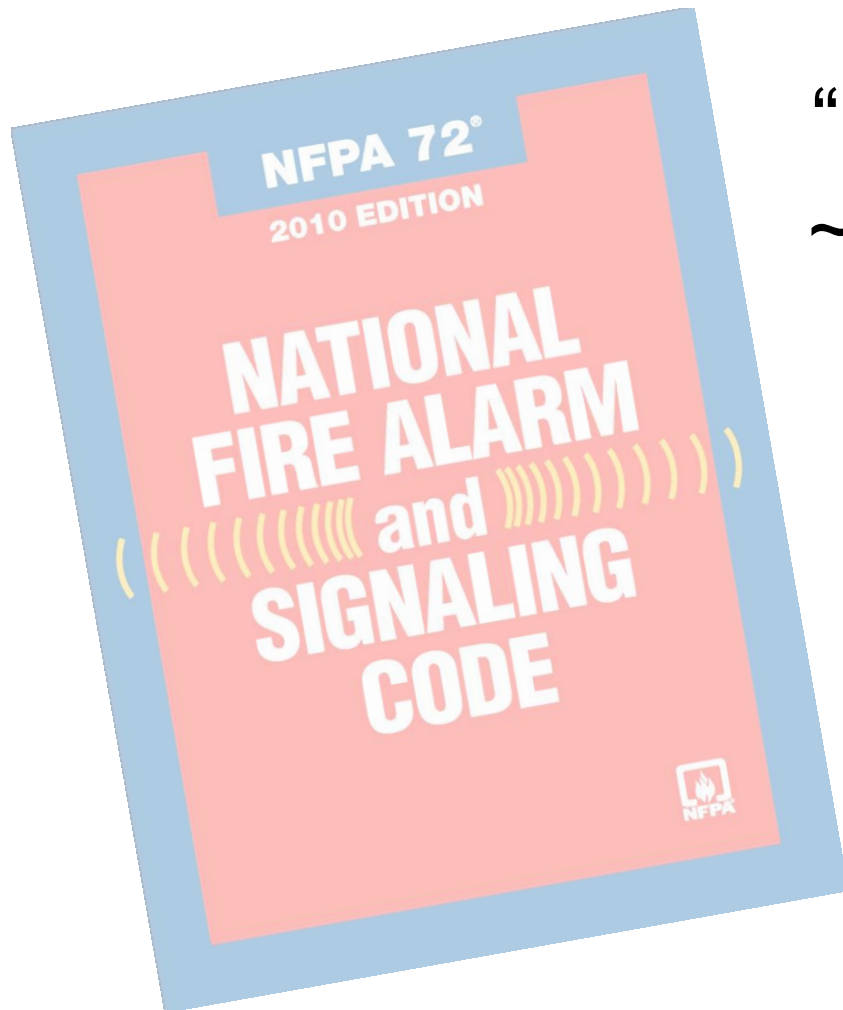
- ❑ Emergency Planning Requires a detailed Risk Analysis (Vulnerability Analysis, Failure Analysis)
 - Risk to the Asset
 - Probability and Frequency of Loss
 - Loss Effect
- ❑ Risk Mitigation
 - Dissemination of Information (**MNS Comes In Here**)
 - Personnel
 - Back Up Systems
 - Back Up (Fallback) Procedures
- ❑ Before, During, After

3.3.84 Emergency Response Plan.

A documented set of actions to address response to natural, technological, and manmade disasters and other emergencies prepared by the stake holders from information obtained during the risk analysis.

This is a Qualitative Risk Analysis hence the documentation requirements

Risk Analysis Requirements in NFPA 72-2010



“Risk Analysis” Appears
~44 times in Chapter 24

NFPA 72-2010 Definition: 3.3.229 Risk Analysis.

A process to characterize the likelihood, vulnerability, and magnitude of incidents associated with natural, technological, and manmade disasters and other emergencies that address scenarios of concern, their probability, and their potential consequences.

Chapter 24

Overview of Key Issues

- In order for the ECS to communicate information properly it must reproduce the desired messages so that the intended listeners will both hear and understand the message.

24.3.1* Intelligible Voice Messages. Requires messages **with voice intelligibility** in accordance with Chapter 18.

- Designers and installers should understand the importance of having a good distribution of speakers rather than trying to use a higher power output of a few speakers.

24.4.1.2 Voice Evacuation Messages.

24.4.1.2.2.2* System design shall incorporate designation of Acoustically Distinguishable Spaces (ADS) within the occupied areas as required in Chapter 18.

24.4.1.2.2.3 Audibility shall be required in all areas in accordance with Chapter 18.

Acoustically Distinguishable Spaces (ADS)

For a standard building configuration with normal ceiling height (8 ft to 12 ft (2.4 m to 3.7 m)), normal ceiling construction (i.e. drop acoustical ceiling tiles), standard wall configurations and finishes and carpeted floors the following should apply:

Acoustically Distinguishable Spaces (ADS)

❑ The audibility and intelligibility of the speakers can be impacted by the tap/setting at which the speaker is connected and should meet the audibility requirements of the Code while still having the message intelligible.

❑ Connecting to a high setting to meet the audibility requirements of the code could distort the intelligibility of the signal.

Acoustically Distinguishable Spaces (ADS)

- ❑ Special attention must be given to acoustically challenging ADSs. Such areas might incorporate appreciable hard surfaces (e.g. glass, marble, tile, metal, etc) or appreciably high ceilings (e.g. atriums, multiple ceiling heights).
- ❑ These conditions will require more stringent design guidelines to ensure intelligibility (e.g. a closer than normal speaker spacing with lower taps).

Acoustically Distinguishable Spaces (ADS)

❑ In an ADS where the ambient noise level exceeds 85dB it is acknowledged that intelligibility might not be attainable and an alternate means of notification is required.

Design guidance is provided in the NEMA Standards Publication:

SB 50-2008, *Emergency Communications Audio Intelligibility Applications Guide*.

Order from www.afoo.org

24.3.5 Pathway Survivability

- **24.3.5.4.1** For systems employing relocation or partial evacuation, a Level 2 or Level 3 pathway survivability shall be required.

24.3.5 Pathway Survivability

- **24.3.5.4.2** For systems that do not employ relocation or partial evacuation, a Level 0, Level 1, Level 2, or Level 3 pathway survivability shall be required.
- The prudent designer or installer will ensure their understanding of the owner's goals and objectives for the ECS and perform a risk analysis as needed to ensure what level of survivability should be used.

Balance of Requirements

■ 24.4.2.19 Visible Notification

- Strobes used solely for mass notification shall be amber in color.
- The word “ALERT” shall be stamped or imprinted on the appliance and be visible to the public.



General System Design Criteria

ADA Implications

The ECS design needs to consider the provisions of the Americans with Disabilities Act. Of particular importance is the recognition that fire alarm strobes (visual notification appliances) are designed to alert the hearing impaired population to evacuate a building. During many non-fire emergencies, it might be more appropriate to have occupants shelter in place. It would therefore be inappropriate to activate the fire alarm strobes.

General System Design Criteria

ADA Implications (continued)

The only viable way to provide content rich information and instructions to the hearing impaired:

- Visual Textual Messages on scrolling signboards, television and computer screens and personal devices like cell phones and pagers. Installing scrolling signboards at every location there are speakers is obviously not practical
- Notify the hearing impaired to move to a location where there is sign board or other textual display is necessary.

Reminder

2011 Annual Distributor Conference
November 13 - 16
At the Westin Beach Resort & Spa
Lt. Lauderdale, FL

Learn What Silent Knight has to offer
For Emergency Communication Systems
Login at www.farenhyt.com and register!



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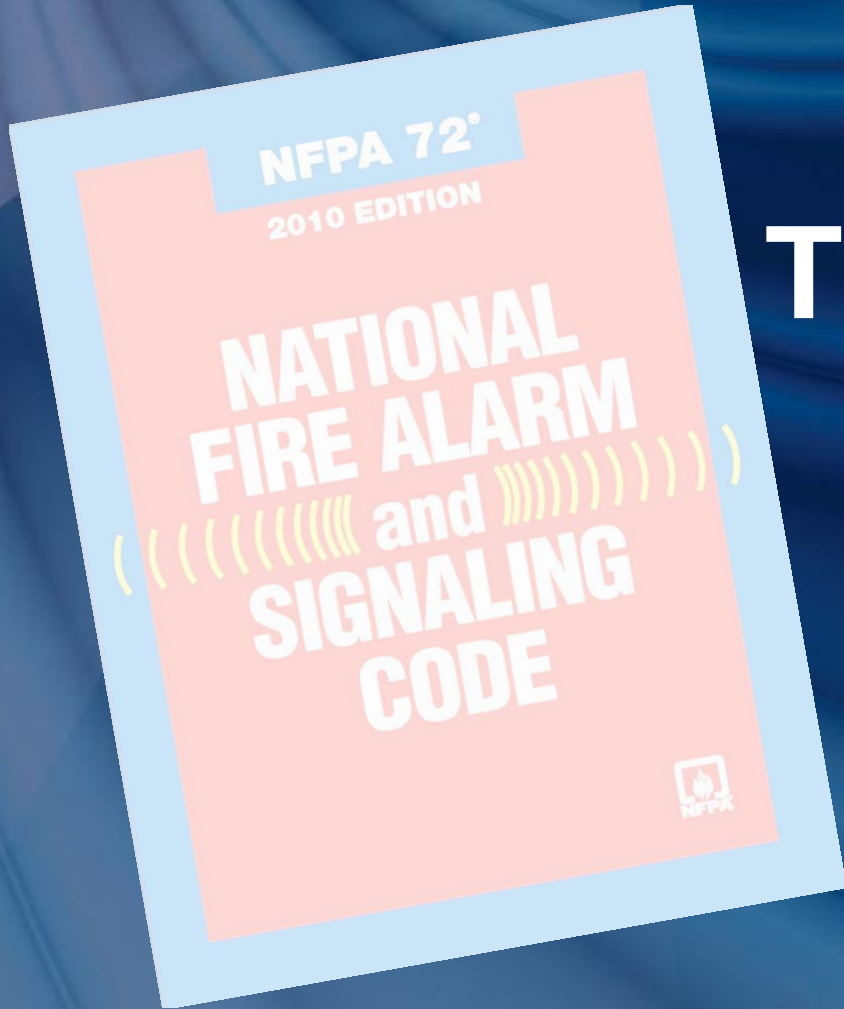
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QUESTIONS???



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Thank you!



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