
BURGLAR & FIRE ALARM
ESTABLISHED 1981
ASSOCIATION OF MICHIGAN
APPRENTICESHIP PROGRAM

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APPRENTICESHIP PROGRAM

Period 1
Related Training Instruction (RTI)
Module 6 – Fire Alarm Signaling Systems

Reading material associated with this module:
Chapters 13, 14, and 17
Fire Alarm Signaling Systems, Fourth Edition 2010

Chapter 13 – Fire Alarm System Testing

- Following installation, a regular program for testing of a fire alarm system is crucial. Where testing may not prevent failures, it can identify failures that have occurred so that they can be repaired promptly to minimize the time during which people and property are unprotected.
- Following are the top 10 reasons a fire alarm system has failed to operate as needed:

  - Faulty sprinkler waterflow switch
  - Lack of fire alarm system maintenance
  - Water in conduit
  - Power failure
  - Telephone line failure / trouble
  - Automatic detector failure
  - Vandalism which was not repaired
  - Backup battery failure
  - Detectors were too sensitive
  - Poor installation of system

Chapter 13 – Fire Alarm System Testing

Testing Types:

- There are two types of testing for fire alarm systems:
  - Acceptance/reacceptance testing performed at the time of installation completion or after significant alterations to the hardware, wiring, or site-specific software. This testing ensures that the system meets its design objectives and is fully operational. All functions of the system should be tested, including operation of the system in various alarm and trouble modes, for which it is designed, for example, open circuit, grounded circuit, and power outage.
  - Periodic testing and maintenance in accordance with NFPA 72 and the manufacturers maintenance recommendations.

Chapter 13 – Fire Alarm System Testing

Acceptance / Reacceptance Testing:

- Test as follows:
  - Test control unit to verify it is in the normal supervisory condition per manufacturers specifications.
  - Initiating and indicating circuits should be tested to confirm conductors are properly monitored.
  - Each initiating device / indicating appliance should be tested for alarm operation and proper response at the control unit. All intended functions should be tested in accordance with the manufacturer's manual to verify proper operation of the system. Primary (main) and secondary (standby) power supplies should be tested.
- A reacceptance test should be performed on all equipment and circuits affected after any addition, deletion, or modification to control equipment hardware, or changes to the site-specific software.
- As part of the acceptance testing the local authority should be furnished a record of completion.

Chapter 13 – Fire Alarm System Testing

Acceptance / Reacceptance Testing (continued):

- Supervising station system verification should include confirmation of proper arrangement, that the signals are transmitted correctly and received properly by the supervising station.
- Supervising station systems include central station service, proprietary station service, and remote supervising station service.
- Supervising station acceptance testing should be done by qualified personnel.
- Complete test and maintenance records should be kept for all systems and components. These records should include specifications, wiring diagrams, floor plans, etc.
- All devices should be approved for their intended purpose.

Chapter 13 – Fire Alarm System Testing

Notification Appliances:

- Audible appliances should be tested to verify that proper sound pressure levels are achieved. Sound pressure levels should be tested with a sound level meter to ensure that they comply with the design objectives. Emergency voice/alarm systems should be tested to verify that the audible messages are distinguishable and understandable.
- Visible appliances should be tested and maintained in accordance with the manufacturer's instructions. Verify that the layout agrees with the plans. Verify that the candela setting agrees with the approved drawings. Confirm that each appliance flashes.

Chapter 13 – Fire Alarm System Testing

Responsibility for Acceptance Testing:

- The owner has the responsibility for the inspections, tests, and maintenance of the fire alarm system. This responsibility may be delegated in writing and copies of the delegation agreements should be provided to the authority having jurisdiction on request.
- People at all locations where the alarm system reports, including building occupants, should be alerted before testing to prevent unnecessary response and notified when testing is concluded.
- Records of inspections, tests, and maintenance should be kept on the premises until the next test and for a minimum of one year after.

Chapter 13 – Fire Alarm System Testing

Acceptance Testing for Automatic Fire Detectors:

- Heat detectors
  - Restorable heat detectors should be tested by exposure to a listed and labeled heat source or in accordance with the manufacturer's published instructions.
  - Pneumatic tube line type detectors should be tested with a listed and labeled heat source or in accordance with the manufacturer's published instructions. Testing can also be conducted with a pressure pump according to manufacturer's instructions.
  - Line and spot type non-restorable fixed temperature heat detectors should be functionally tested mechanically and electrically. Do not perform heat test.
  - Detectors with fusible alloy element should be tested by removing the element to be certain the contact works. Reinstall element to restore.

Chapter 13 – Fire Alarm System Testing

Acceptance Testing for Automatic Fire Detectors (continued):

- Smoke, flame and other fire detectors
  - Test each detector with smoke or aerosol. This provides verification that smoke can enter the chamber to activate the device.
  - Flame and gas detectors should be tested for operation in accordance with instructions supplied by the manufacturer or other test methods acceptable to the local authority having jurisdiction.

Chapter 13 – Fire Alarm System Testing

Fire Alarm System Initial Inspection Required Information:

1. Date
2. Test frequency
3. Name of property
4. Address
5. Name of person / company performing inspection, testing, or maintenance and their contact information
6. Name, address, and representative of approving agency or agencies
7. Designations of detectors tested
8. Functional test of detectors.
9. Functional test of required sequence of operations.
10. Check of all smoke detectors.
11. Loop resistance for all fixed-temperature line-type detectors, if any
12. Functional test of all mass notification control units
13. Functional test of signal transmission to mass notification systems
14. Functional test of mass notification system to silence fire alarm notification appliances
15. Test of intelligibility of mass notification speakers
16. Other tests as required by equipment manufacturer
17. Other tests as required by the authority having jurisdiction
18. Signature of tester and approval of authority representative
19. Description of problems identified during the test

Chapter 13 – Fire Alarm System Testing

Interface Equipment:

Increasingly, building fire alarm systems are being integrated with other building systems to perform critical emergency functions. It is crucial to the reliability of these functions that both acceptance testing and periodic testing be performed to ensure that these integrated functions operate as intended. A partial list of these systems could include elevator recall, two-way radio communications enhancement systems, two-way emergency communication systems for rescue assistance, and smoke control.

- These systems should be tested as part of an integrated test procedure. This will necessitate coordinated testing of the interaction of several systems involving technicians for the various trades.
- The interface equipment connections can be tested by operating or simulating the equipment being supervised.
- Verify required signals are received at the control unit.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance:

- Maintenance:
  - Proper maintenance is as important as regular testing in a fire alarm system.
  - Automatic fire detector maintenance depends on the specific type of detector used and local environmental conditions.
  - The manufacturer's recommendations should be implemented in the maintenance program to maintain system reliability.
- Automatic Fire Detectors:
  - Visually inspect each detector to ensure it is in good condition, and that there are no changes such as building modifications, occupancy hazards, and environmental effects that would affect its performance.
  - Detectors require periodic cleaning to remove dust and dirt that may have accumulated. Each detector should be cleaned, checked, operated, and sensitivity tested according to the manufacturer's instructions.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Smoke, Flame, and Other Fire Detectors:
  - Smoke detectors should be visually inspected semi-annually to ensure they are in place, do not have impeded smoke entry, are abnormally dirty, or not suitably located due to occupancy or structural changes.
  - Smoke detectors should be tested annually for smoke entry and alarm response.
  - Test smoke detector sensitivity with a specific level of smoke within the first year after installation and every alternate year thereafter. Detectors with a sensitivity out of range should be replaced or, if listed as field adjustable; adjusted, cleaned, and recalibrated.
  - Air duct detectors require additional tests, consisting of visual inspection of the installation to detect any abuse or modification of the device or installation and its intended operation. Verification needs to be performed to ensure that the device will respond to smoke in the airstream. Smoke entry tests are also required.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Smoke, Flame, and Other Fire Detectors:
  - Flame detector sensitivity is affected by dust and dirt buildup on the lens. The lens should be cleaned periodically for optimum performance.
  - All flame, fire-gas, and other detectors should be tested semiannually per the manufacturer's instructions as well as for obstructions.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Heat Detectors:
  - For non-restorable spot type heat detectors, after 15 years of service all detectors should be replaced, or at least 2 detectors out of 100 should be removed and sent for testing. The detectors removed for testing are to be replaced with new.
  - If a failure occurs on any of the detectors removed, additional detectors should be removed and tested until either a general problem involving faulty detectors, or a localized problem involving one or two detectors is found.
  - For restorable spot type heat detectors, one or more detectors on each signaling line circuit should be tested annually and different detectors selected for each test. Each detector should be tested within 5 years. Test records shall be kept by the building owner specifying which detectors have been tested.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Heat Detectors (continued):
  - All pneumatic line-type detectors should be tested for leaks and proper operation annually.
  - Non-restorable line-type fixed-temperature detectors should also be tested for alarm function at least annually. The loop resistance should be measured, recorded, and compared with previously recorded data and any change in loop resistance investigated.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Fire Alarm Signaling Systems:
  - Fire alarm signaling systems should be tested and inspected at prescribed intervals.
  - Reacceptance testing should be performed whenever an initiating device, notification appliance, or control relay is added. During reacceptance testing the new item shall be functionally tested. When an initiating device, notification appliance, or control relay is deleted another device, appliance, or control relay on the circuit shall be tested.
  - When modifications or repairs are made to the control unit, the control equipment shall be tested to verify correct receipt of input and output signals and supervisory functions.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Fire Alarm Signaling Systems:
  - When changes are made to site-specific software, all functions affected by the change should be tested; additionally, 10 percent of unaffected devices, up to a maximum of 50 devices, should be tested.
  - All apparatus should be restored to normal as promptly as possible after each test or alarm and kept in normal condition for operation.
  - A complete record of testing and operations should be kept until the next test and for one year thereafter.
  - The records should be available for examination and reported to the local authority when required.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Fire Alarm Signaling Systems:
  - Disconnect all primary power supplies and operate general alarm systems for a minimum of 5 minutes and emergency voice communication systems for a minimum of 15 minutes.
  - Perform a circuit integrity test on each initiating device circuit, notification appliance circuit and signaling line circuit for correct indication at the control unit based on the pathway classification.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Supervising Station Alarm Systems:
  - Tests of circuits extending from the central station and tests of central station devices should be made at intervals not exceeding 24 hours. Complete tests should be performed on receiving equipment monthly.
  - When conducting a test of a supervising station alarm system, activation of an initiating device should cause receipt of a signal at the supervising station within 90 seconds. Digital alarm communicator transmitters (DACTs) should be inspected to ensure two separate means of communication are available.
  - DACTs should be tested for line seizure capability while the telephone line is in use. The primary and secondary lines should be individually disconnected to verify that in each case a trouble signal is initiated and sent to the supervising station within 4 minutes from detection of the fault.
  - With a fault in the in the primary telephone line simulated, it should be verified that a signal is sent using the second telephone line.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Supervising Station Alarm Systems:
  - Performance-based technologies should be tested annually.
  - Perform tests to ensure the monitoring of integrity of the transmission technology and technology path.
  - Where a single communications path is used, disconnect the communication path. Manually initiate an alarm signal transmission and verify the premises unit annunciates the failure within 200 seconds of the transmission failure.
  - Where multiple communication paths are used, disconnect both communications paths. Manually initiate an alarm signal transmission and verify the premises unit annunciates the failure within 200 seconds of the transmission failure.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Connections to Sprinkler Systems:
  - Semiannual tests should be performed on sprinkler waterflow alarms switches.
  - Water shall be flowed through an inspector's test connection indicating the flow of water equal to that from a single sprinkler of the smallest orifice size installed in the system or other listed waterflow test methods for wet-pipe systems, or an alarm test bypass connection for dry-pipe, pre-action, or deluge systems.
  - Control valve switches should be tested semiannually.
  - All other sprinkler supervisory devices should be tested annually.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Public Emergency Alarm Reporting Systems:
  - Publicly accessible initiating devices (alarm boxes) should be actuated under normal circuit conditions semiannually. Receipt of not less than three complete rounds of signal pulses shall be verified.
  - Each initiating device of an auxiliary box should be tested by actuation of the initiating device and verifying receipt of a minimum of three complete rounds of signal pulses.
  - The master box shall be tested for manual operation semiannually and for auxiliary operation annually.
- Remote-Station and Proprietary Systems:
  - All operator controls at the remote supervising station should be tested at each change of shift or change in personnel, and the status of all alarm, supervisory, and trouble signals should be recorded.

Chapter 13 – Fire Alarm System Testing

Periodic Testing and Maintenance (continued):

- Notification Appliances:
  - Audible, textual, and visual notification appliances should be tested for operation on an annual basis.
  - During acceptance or reacceptance testing of audible notification appliances, measure sound pressure levels for alert tone signals and evacuation signal tones to verify compliance with the required performance documents.
  - During initial and reacceptance testing of visual notification devices, verify appliance locations and candela rating. Confirm that each device flashes.

Chapter 14 – Communications Centers – Public Fire Service

Introduction:

This chapter covers the installation, maintenance, and use of a communication system and the facility in which it is located, and communication center operation, including retransmission of alarms and reporting and dispatch systems.

- Two NFPA standards pertain to communications centers. NFPA 72 describes signal transmission to communication centers and NFPA 1225 (Standard for Emergency Services Communications), covers installation, maintenance, and use of communication systems. NFPA 1225 is a consolidation, published in 2022, of NFPA 1221 *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, and NFPA 1061 *Standard for Public Safety Telecommunications Personnel Professional Qualifications*.

Chapter 14 – Communications Centers – Public Fire Service

Introduction (continued):

- Communications systems listed on the following slide provide the following functions:
  - Communication between the requester and emergency response agencies.
  - Communication within the emergency response agency under emergency and non-emergency conditions.
  - Communications among emergency response agencies.

Chapter 14 – Communications Centers – Public Fire Service

Introduction (continued):

- Computer aided dispatching systems
- Telephone systems
- 9-1-1 systems
- Next Generation 9-1-1 systems
- Multi-line telephone systems (MLTS) used to access the Enhanced 9-1-1 systems
- Telematics
- Emergency response facility alerting systems
- Public and private alarm reporting systems
- One-way and two-way radio systems
- Nationwide public safety broadband network (NPSBN)

Chapter 14 – Communications Centers – Public Fire Service

Introduction (continued):

- A communications center is defined as the building or portion of a building that is specifically provided for the primary purpose of providing emergency communications services or public safety answering point services to one or more public safety agencies.
- The center is also usually the location for necessary testing, switching, receiving, retransmitting, and power supply devices.

Chapter 14 – Communications Centers – Public Fire Service

Communication Center Location and Construction:

- If located adjacent to another structure, the exposed walls shall be constructed in accordance with the building code legally in effect.
- If located within 150 ft. of the potential collapse zone of a taller structure, the roof shall be designed to resist damage that might be caused by partial or total collapse of the adjoining structure(s).
- The lowest floor elevation shall be above the 500-year flood plain established by FEMA. If constructed below grade, the building shall be designed for the location, and the lowest floor of the facility is to be above the 500-year flood plain.
- Building should have a Class A roof covering.
- Communications centers located in buildings occupied for purposes other than emergency communications shall be separated by fire barriers having a fire resistance rating of 2 hours.

Chapter 14 – Communications Centers – Public Fire Service

Communication Center Location and Construction (continued):

- The building shall be provided with proper HVAC to maintain temperature and relative humidity within the limits of the equipment critical to the operations.
- Fire extinguishers shall be provided in accordance with NFPA 10.
- Automatic fire detection, alarm, and notification shall be provided and be monitored in the operations room.
- Operation of notification appliances shall not interfere with communications operations.
- The building housing the communications center shall be protected throughout by an approved, supervised, automatic sprinkler system in accordance with NFPA 13.
- The communications center and other buildings that house essential operating equipment shall be protected against damage from vandalism, terrorism, and civil disturbances.
- Entry shall be restricted to essential personnel.
- Potential points for unauthorized entry shall be protected by an electronic intrusion detection system.

Chapter 14 – Communications Centers – Public Fire Service

Communication Center Location and Construction (continued):

- Entryways to the communications center shall be protected by a security vestibule.
- Door openings to be protected by listed, self-closing fire doors with a fire-resistance rating not less than 1 hour, as well as providing Level 4 bullet resistance.
- Perimeter walls, and windows where provided, shall provide ballistic protection rated to Level 4.
- The communications center must be provided with a critical operations power system in accordance with NFPA 70.
- At least two independent and reliable power sources shall be provided, one primary and one emergency, each with adequate capacity for operation of the communications center.

Chapter 14 – Communications Centers – Public Fire Service

Communication Center Location and Construction (continued):

- One of the following shall provide primary power:
  - Commercial utility distribution system.
  - An approved engine-driven generator installation, under the control of the communications center staff, designed for continuous duty.
  - An approved engine-driven generator installation, under the control of the communications center staff, arranged for cogeneration with commercial light and power.
- Emergency power supply system shall consist of one or more engine-driven generators with automatic transfer upon failure of primary power.
- Emergency lighting shall be provided, that illuminates automatically within 15 seconds of failure of normal lighting power.
- Redundant emergency lighting units shall be provided for the operation room, at locations of communications equipment, and at the engine-driven generators.

Chapter 14 – Communications Centers – Public Fire Service

Operation of the Communication Center:

- Reports of fires and emergencies normally originate from one of three sources:
  - General public.
  - Business (industrial, commercial, institutional, and mercantile).
  - Other public service/safety agencies.
- Reporting can occur from any of the following sources:
  - The most common is conventional commercial telephone systems (public, cellular, VoIP).
  - Public emergency reporting / fire alarm systems.
  - Privately operated automatic alarm systems.

Chapter 14 – Communications Centers – Public Fire Service

Operation of the Communication Center (continued):

- Public Emergency Alarm Reporting Equipment (Communications Center):
  - There are two types of alarm systems:
    - Type A systems shall be provided when the number of all alarms required to be retransmitted exceeds 2500 per year. Where a Type A system is required, the automatic retransmission of incoming alarms shall be permitted, provided that approved facilities are provided for the automatic receipt, storage, retrieval, and retransmission of alarms in the order received.

Chapter 14 – Communications Centers – Public Fire Service

Operation of the Communication Center (continued):

- Public Emergency Alarm Reporting Equipment (Communications Center):
  - Type B systems shall be permitted when the number of alarms from alarm boxes is 2500 or less per year provided the following conditions are met:
    - Alarms from alarm boxes are automatically transmitted to an emergency response facility where approved equipment is provided for the automatic receipt, storage, and retrieval of alarms.
    - Audible and visual alerting devices are provided at the emergency communications center and the emergency response facility.
    - All circuits and pathways used for alarm receiving and alerting equipment are monitored for integrity between the emergency communications center and the emergency response facility.
    - Audible and visual trouble signals are provided at both the emergency communications center and the emergency response facility to indicate the failure of the circuit or pathway.

Chapter 14 – Communications Centers – Public Fire Service

Operation of the Communication Center (continued):

- Dispatch Circuits and Equipment:
  - A dispatch circuit is the means by which the fire alarm dispatcher notifies the fire companies to respond to an alarm. The location from which the alarm was received is the minimum information that should be transmitted.
  - Two separate means of transmitting alarms to fire stations should be provided. Only one means of transmission is necessary when less than 730 alarms per year are recorded.
  - The failure of any component of the primary circuit should not affect the operation of the secondary circuit.
  - Each alarm transmitted, along with the date and time should be automatically recorded.

Chapter 14 – Communications Centers – Public Fire Service

Operation of the Communication Center (continued):

- Computer-Aided Dispatch:
  - Computer-aided dispatch (CAD) is a process by which a computer and its associated terminal(s) provides relevant dispatch data (running assignments, address directions, equipment status, utility locations, special hazards, etc.) to the dispatch or operator concerned.
  - A CAD system used for dispatch operations should be supplemented with a secondary dispatch method available to operate in the event the CAD system fails.
  - The dispatch computer should not be used for other department applications and should be kept free of time-consuming processes to allow for rapid retrieval of dispatch information.
  - All components that are required for the operation of the CAD systems shall be supplied with power through an approved SEPSS (stored emergency power supply system). The SEPSS shall be capable of supporting the critical loads for no less than 60 minutes.

Chapter 17 – Code Requirements

Introduction:

Code requirements for fire alarm systems can often be confusing as multiple or varying codes and standards may apply to a particular system. Designers of fire alarm systems must have a thorough understanding of the applicable codes and standards for a particular locality and additional requirements that may apply based on federal, state, corporate, or association standards.

Testing laboratories standards are also an important consideration when designing and installing fire alarm system equipment. All equipment utilized in a fire alarm system must be listed by an independent testing laboratory for the purpose for which it is used. Examples of a nationally recognized testing laboratory (NRTL) include:

FM	Factory Mutual
UL	Underwriters Laboratories
ETL	Intertek

Chapter 17 – Code Requirements

Introduction (continued):

Fire alarm system requirements are based on the occupancy of the structure for which the system is intended. A local or state building code will typically specify the type of fire alarm system, detection, and notification that is required. This is normally the minimum requirements necessary to obtain authorization to occupy the building (Certificate of Occupancy). Increased levels of protection may be required by federal, state, or local agencies as well as corporate standards, (ex. hotel chain design standards).

Once the type of system and level of protection is determined, installation standards (NFPA 72, NFPA 70) and the manufacturer's published instructions provide the requirements necessary to complete the installation of the system.

Chapter 17 – Code Requirements

Requirements in Building and Fire Codes:

- Fire safety codes and standards developed by the National Fire Protection Association (NFPA) can be adopted by local communities, either by reference (where only the title and publishing information are mentioned in the local code) or by transcription (printing of the standard in the local code).
- Model building codes are developed by private associations for modification and adoption by local communities. Examples of these codes are *NFPA 5000 Building Construction and Safety Code*, and the *International Code Council's (ICC) International Building Code and Residential Building Code*. The State of Michigan has adopted the *ICC Internation Building Code,* with state-specific amendments and additions to meet local needs and is published by the ICC as the Michigan Building Code. This code has been adopted statewide.

Chapter 17 – Code Requirements

Requirements in Building and Fire Codes (continued):

- Code requirements for fire alarm signaling systems generally define the following:
  - Occupancy descriptions and classifications.
  - Location requirements for smoke detectors.
  - The need for, and function of, a fire alarm and emergency communications system (if an emergency communications system is determined necessary for the occupancy protected).
  - Operation of the voice/alarm function of a system.
  - Provision for a fire department communications system.
  - Components for a fire command station.
  - Emergency power requirements.
  - Manual fire alarm station location and use.
  - Exit door unlocking devices.

Chapter 17 – Code Requirements

Requirements in Building and Fire Codes (continued):

- Occupancy Classifications:
  - Use Group A – Assembly:
    - Gathering of persons for purposes such as civic, social, or religious functions, recreation, for food or drink consumption, or awaiting transportation.
    - Five different classifications (A-1 through A-5) based on the type of assembly purpose or location.
  - Use Group B – Business:
    - Used for office, professional, or service-type transactions, including storage of records and accounts.
  - Use Group E – Educational:
    - Used for educational purposes through the 12th grade.

Chapter 17 – Code Requirements

Requirements in Building and Fire Codes (continued):

- Occupancy Classifications (continued):
  - Use Group F – Factory:
    - Used for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair, or processing operations, not otherwise classified as Group H hazardous or Group S storage. Two classifications are defined: F-1 moderate hazard and F-2 low hazard.
  - Use Group H – High Hazard:
    - Manufacturing, processing, generation, or storage of materials that constitute a physical or health hazard above specific maximum allowable quantity limits.

Chapter 17 – Code Requirements

Requirements in Building and Fire Codes (continued):

- Occupancy Classifications (continued):
  - Use Group I – Institutional:
    - Used for care or supervision provided to persons incapable of self-preservation without physical assistance or detained penal or correctional purposes.
    - Four classifications (I-1 through I-4) based on supervision, care level, and self-preservation level and type.
  - Use Group M – Mercantile:
    - Used for display and sale of merchandise including stocks of goods, wares, and merchandise, including public access.
  - Use Group R – Residential:
    - Used for sleeping purposes (other than Group I or the Michigan Residential Code).
    - Four classifications (R-1 through R-4).

Chapter 17 – Code Requirements

Requirements in Building and Fire Codes (continued):

- Occupancy Classifications (continued):
  - Use Group S – Storage:
    - Used for storage that is not classified as a hazardous occupancy.
    - Two classifications provided: S-1 for moderate-hazard storage and S-2 for low-hazard storage.
  - Use Group U – Utility
    - Buildings and structures of an accessory character and miscellaneous structures not included under any specific occupancy conforming to the requirements of the code commensurate with the fire and life safety hazard incidental to their occupancy.
      - Agricultural buildings
      - Communication structures
      - Greenhouses
      - Tanks
      - Towers

Chapter 17 – Code Requirements

Requirements in Building and Fire Codes (continued):

- Additional codes that may affect fire alarm system design adopted statewide in Michigan include (not all inclusive):
  - Michigan Residential Building Code (ICC)
  - Michigan Rehabilitation Code (ICC)
  - Michigan Mechanical Code (ICC)
  - National Electrical Code (NEC - NFPA) with Michigan Part 8 Electrical Code Rules
  - ASME 17.1 Safety Code for Elevators and Escalators

Chapter 17 – Code Requirements

Requirements in Local Building and Fire Codes (continued):

- The Bureau of Fire Services Plan Review Division reviews all new construction, additions, or renovations of state regulated facilities in addition to the authority of the Bureau of Construction Codes, including:
  - Adult Foster Care
  - Educational Facility including K-12 school, charter school, college, university, and dormitory
  - Health Care Facility including CMCF, FSOF, HFA, hospice, hospital, hospital within a hospital, and nursing home
  - Penal Facilities
  - Childcare Facilities including childcare centers, childcare institutions, and camps
  - Marihuana grow, processing, micro-business, and designated consumption establishments

Chapter 17 – Code Requirements

Requirements in Building and Fire Codes (continued):

- The Michigan Fire Safety Rules, which provide the regulatory requirements followed by the Bureau of Fire Services Plan Review Division, adopts various NFPA documents and therefore, fire alarm plans and specifications for these facilities may require the use of multiple NFPA documents.
- The adopted documents include multiple editions of both the NFPA 101 Life Safety Code and NFPA 72. These document requirements may change based on updates to the Michigan Fire Safety Rules, which can happen at differing times. It is always in your best interest to consult the Bureau of Fire Services website to determine the required documents and editions when you are working on fire alarm designs for state-regulated facilities.
- Be aware that the codes utilized by the Bureau of Construction Codes and the Bureau of Fire Safety may contain different requirements which will **all** be applicable to the fire alarm systems within these facilities.

END OF PERIOD 1 – MODULE 6