BURGLAR & FIRE ALARM ASSOCIATION OF MICHIGAN

ESTABLISHED 1981

APPRENTICESHIP PROGRAM

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APPRENTICESHIP PROGRAM

Period 3
Related Training Instruction (RTI)
Module 6 – Michigan Building Code (MBC), Chapter 9 – Part 4, 10, 27

Reading material associated with this module:
Chapter 9, 10, 27
Michigan Building Code (MBC), 2021 Edition

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Michigan Building Code (MBC), 2021 Edition
Chapter 9 – Sections 908 to 918

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 908 – Emergency Alarm Systems:
  - Group H (Hazardous) occupancies require emergency alarms for the detection and notification of an emergency condition in accordance with Section 415.5.
  - Emergency alarms for notification of an emergency condition in an HPM facility shall be provided as required by Section 415.11.4.
  - Where an emergency alarm signal is interfaced with a building's fire alarm system, the signal produced at the fire alarm control unit shall be a supervisory signal.
  - The alarm signal shall be local, as well as supervised by an approved central, proprietary, or remote supervising station, or initiating an audible and visual signal at a constantly attended on-site location.

908.1, 908.2, 908.3, 415.5.3, 415.11.4

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 909 – Smoke Control Systems:
  - Smoke control systems are typically designed by the fire protection engineer and mechanical engineer and have specific performance requirements noted in Section 909.
  - These systems are typically subject to “special inspections” utilizing experienced commissioning teams to verify compliance of the smoke control design with its final installed condition.
  - Fire detection systems providing control input or output signals to a smoke control system or elements thereof, shall comply with the requirements of Section 907. Such systems shall be equipped with a control panel complying with UL 864 and listed as smoke control equipment (UL listing category UUKL).

909, 909.12

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 909 – Smoke Control Systems:
  - In addition to complying with the requirements of NFPA 70 (National Electrical Code), all fire detection and control wiring shall be fully enclosed in continuous raceway, regardless of the voltage.
  - Identical control diagrams showing all devices in the system and identifying their location and function shall be maintained current and kept on file with fire code official, the fire department, and in the fire command center in a format and manner approved by the fire code official.

909.12.2, 909.15

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 911 – Fire Command Center:
  - Where required by other sections of this code, in buildings classified as high-rise, and in all F-1 and S-1 occupancies with a footprint over 500,000sf, a fire command center for fire department operations shall be provided and contain the following:
    - The EVACS control unit.
    - The fire department communications center.
    - Fire detection and alarm system annunciator.
    - Annunciator unit visually indicating the location of the elevators and whether they are operational.
    - Status indicators and controls for air distribution systems.
    - The fire fighter's control panel required by Section 909.16 for smoke control systems installed in the building.

911.1.911.1.6

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 911 – Fire Command Center:
  - Controls for unlocking interior exit stairwell doors simultaneously.
  - Sprinkler valve and waterflow detector display panels.
  - Emergency and standby power status indicators.
  - Telephone for fire department use with controlled access to the public telephone system.
  - Fire pump status indicators.
  - Generator supervision devices, manual start and transfer features.
  - Public address system, where specifically required by other sections of the code.
  - Elevator fire recall switch.
  - Elevator emergency or standby power selector switch(es), where provided.

911.1.6

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 914 – Emergency Responder Safety Features:
  - Fire protection equipment shall be identified in an approved manner. Rooms containing controls for air-conditioning systems, sprinkler risers and valves or other fire detection, suppression or control elements shall be identified for the use of the fire department.
  - Approved signs required to identify fire protection equipment and equipment location shall be constructed of durable materials, permanently installed and readily visible.

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 915 – Carbon Monoxide Detection:
  - Carbon monoxide (CO) detection shall be installed in new buildings in accordance with Sections 915.1.1 through 915.6. Carbon monoxide detection shall be installed in existing buildings in accordance Chapter 11 of the International Fire Code.
  - CO detection shall be provided in Group I-1, I-2, I-4, and R occupancies and in classrooms in Group E occupancies in the locations specified in Section 915.2 under the following conditions:
    - CO detection shall be provided in dwelling units, sleeping units, and classrooms that contain a fuel-burning appliance, fireplace, or furnace.
      - Exception for furnaces if a CO detector is located in the first room or area served by each main duct leaving the furnace and the CO alarm signals are automatically transmitted to an approved location.

915.1, 915.1.1, 915.1.2, 915.1.3

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 915 – Carbon Monoxide Detection:
  - CO detection shall be provided in dwelling units, sleeping units, and classrooms located in buildings that contain fuel-burning appliances or fireplaces.
    - Exception for a CO detector in dwelling units, sleeping units, and classrooms if there are no communicating openings between the fuel-burning appliance or fireplace and the dwelling unit, sleeping unit, or classroom.
    - Exception for detection in dwelling units, sleeping units, and classrooms if a CO detector is provided in one of the following locations:
      - In an approved location between the fuel-burning appliance or fireplace and the dwelling unit, sleeping unit or classroom.
      - On the ceiling of the room containing the fuel-burning appliance or fireplace.

915.1.4

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 915 – Carbon Monoxide Detection:
  - CO detection shall be provided in dwelling units, sleeping units, and classrooms located in buildings with attached private garages.
    - Exception for a CO detector in dwelling units, sleeping units, and classrooms without communicating openings between the private garage and the dwelling unit, sleeping unit, or classroom.
    - Exception for detection in dwelling units, sleeping units, and classrooms located more than one story above or below a private garage.
    - Exception if the private garage connects to the building through an open-ended corridor.

915.1.5

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 915 – Carbon Monoxide Detection:
  - CO detection shall be installed in the locations specified as follows:
    - In dwelling units outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning appliance is located within a bedroom or attached bathroom, CO detection shall be installed within the bedroom.
    - Exception: CO detection shall be installed in sleeping units unless it does not contain a fuel-burning appliance or is not served by a forced-air furnace.
    - CO detection shall be installed in classrooms of Group E occupancies and the alarm signals shall be transmitted to an on-site location staffed by school personnel.
    - Exception: CO detectors shall not have to transmit a signal to an on-site location staffed by school personnel in Group E occupancies with an occupant load of 30 or less.

915.2.1, 915.2.2, 915.2.3

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 915 – Carbon Monoxide Detection:
  - CO detection shall be provided by either CO alarms complying with Section 915.4 or CO detection systems complying with Section 915.5 as follows:
    - CO alarms shall receive their primary power from the building wiring, and when power is interrupted shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than for overcurrent protection.
    - Exception for buildings without commercial power, a battery powered CO alarm shall be an acceptable alternative.
    - CO alarms shall be listed in accordance with UL 2034.
    - CO alarms shall only be installed in dwelling and sleeping units. They shall not be installed in locations where the code requires CO detectors to be used.
    - Combination CO/smoke alarms are permitted. Combination CO/smoke alarms shall be listed in accordance with UL 2034 and UL 217.

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 915 – Carbon Monoxide Detection:
  - CO detection shall be provided by either CO alarms complying with Section 915.4 or CO detection systems complying with Section 915.5 as follows:
    - CO detection systems shall comply with NFPA 720, *Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*.
    - CO detectors shall be listed in accordance with UL 2075.
    - CO detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 720.
    - Combination CO/smoke detectors installed in CO detection systems are permitted, provided they are listed in accordance with UL 2075 and UL 268.
  - CO alarms and CO detection systems shall be maintained in accordance with the International Fire Code (IFC).

915.3, 915.5, 915.6

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 916 – Gas Detection Systems:
  - Permits shall be required and documentation of the gas detection system and equipment to be used that demonstrates compliance with this code and the IFC shall be provided with the application for permit.
  - Gas detection equipment shall be designed for use with the gases being detected and installed in accordance with the manufacturer's instructions.
  - Gas detection system shall be permanently connected to building power or permitted to be cord connected to an unswitched receptacle using an approved restraining means.
  - Standby or emergency power shall be provided, or the system shall initiate a trouble signal at an approved location if power is interrupted.

916.2, 916.2.1, 916.3, 916.4, 916.5

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 916 – Gas Detection Systems:
  - Sensors shall be installed in approved locations where leaking gases are expected to accumulate.
  - Gas sampling shall be performed continuously. Sample analysis shall be processed immediately after sampling, except as follows:
    - HPM gases shall be sampled at intervals not exceeding 30 minutes.
    - For toxic gases that are not HPM, sampling shall not exceed 5 minutes.
    - Where a less frequent or delayed sampling interval is approved.
  - A gas detection alarm shall be initiated as follows:
    - Flammable gases, with a concentration exceeding 25% of the lower flammability limit (LFL).
    - Nonflammable gases, with a concentration exceeding ½ of the IDLH (Immediately Dangerous to Life or Health), unless a different threshold is specified by this code.

916.6, 916.7, 916.8

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 916 – Gas Detection Systems:
  - Upon activation of a gas detection system, alarm signals or other responses shall be as specified by other sections of this code. Audible and visual gas alarm signals shall be distinct from fire alarm and CO alarm signals.
  - Signs shall be provided adjacent to the gas detection system alarm signaling devices to advise of the nature of the signals and actions to take in response to the signals.
  - Gas detection sensors and gas detection systems shall not be connected to fire alarm systems unless approved and connected in accordance with the fire alarm equipment manufacturer's instructions.
  - Gas detection systems and sensors shall be inspected, tested, and calibrated in accordance with the IFC.

916.8, 916.9, 916.10, 916.11

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 917 – Mass Notification Systems:
  - Prior to construction of a new building requiring a fire alarm system on a multiple-building college or university campus having a cumulative building occupant load of 1000 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. When the risk analysis determines a need for mass notification, an approved mass notification system shall be provided in accordance with the findings of the risk analysis.

2021 Michigan Building Code (MBC)

Chapter 9 – Fire Protection and Life Safety Systems:

- Section 918 – Emergency Responder Communication Coverage:
  - In-building two-way emergency responder communication coverage shall be provided in all new buildings in accordance with Section 510 of the International Fire Code (IFC).
  - IFC Section 510.1:
    - In-building two-way emergency responder communication coverage within the building shall be based on the existing coverage levels of the public safety systems utilized by the jurisdiction, measured at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.
    - Exceptions are provided for wired communications systems if approved by the building code official and fire code official; when the radio coverage systems is not needed as determined by the fire code official; and where the system could have a negative impact of the operations of the facility.

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Michigan Building Code (MBC), 2021 Edition
Chapter 10 – Means of Egress

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1003 – General Means of Egress:
  - Structural elements, fixtures or furnishings shall not project horizontally from either side more than 4" over any walking surface between the heights of 27" and 80" above the walking surface.
  - Protruding objects shall not reduce the minimum clear width of accessible routes.

1003.3.3, 1003.3.4

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1009 – Accessible Means of Egress:
  - Areas of refuge shall be provided with a two-way communication system between the area of refuge and the fire command center or a central control point approved by the fire department.
  - If the central control point is not constantly attended, there shall be a timed automatic dial-out capability that provides two-way communication with an approved supervising station or 911. The two-way communication system shall include both audible and visual signals.
  - Signage shall include operating instructions for the two-way communication system, including for summoning assistance and identification of the location.

1009.8, 1009.8.1, 1009.8.2

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1010 – Doors, Gates and Turnstiles:
  - Sensor release of electric locking systems shall be permitted on doors located in the means of egress in any occupancy except Group H as follows:
    - Loss of power to the locking system or hardware that controls the door shall unlock the door.
    - Request to Exit (REX) sensor shall be provided on egress side of door to detect an occupant approaching door.
    - REX sensor shall unlock door on detection of occupant or loss of power.
    - A manual unlocking device identified as “PUSH TO EXIT”, installed 40"- 48" above the floor, and within 5' of the door shall unlock the door when operated. The device shall directly interrupt power to the lock, and the door shall remain unlocked for not less than 30 seconds.

1010.2.12

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1010 – Doors, Gates and Turnstiles:
  - Sensor release of electric locking systems shall be permitted on doors located in the means of egress in any occupancy except Group H. Common rules that apply to sensor release are (continued):
    - Activation of the building fire alarm, automatic sprinkler, or fire detection systems, where provided, shall unlock the door and the electric lock shall remain unlocked until the fire alarm system has been reset.
    - The door locking system units shall be listed in accordance with UL 294.

1010.2.12

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1010 – Doors, Gates and Turnstiles:
  - Delayed egress locking systems shall be permitted to be installed on doors serving the following occupancies in buildings that are equipped throughout with an automatic sprinkler system or an approved automatic smoke or heat detection system:
    - Group B, F, I, M, R, S, and U occupancies.
    - Group E classrooms with an occupant load less than 50.
    - In courtrooms in Group A-3 or B occupancies, delayed egress locking systems shall be permitted to be installed on exit or exit access doors, other than the main exit or exit access door in buildings equipped throughout with an automatic sprinkler system.

1010.2.13

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1010 – Doors, Gates and Turnstiles:
  - The delayed egress locking system shall be installed and operated as follows:
    - The delay electronics shall deactivate upon actuation of the automatic sprinkler system or automatic fire detection system allowing immediate free egress.
    - The delay electronics shall deactivate upon loss of power controlling the lock or lock mechanism allowing immediate free egress.
    - The delayed egress locking system shall have the capability of being deactivated at the fire command center and other approved locations.

1010.2.13.1

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1010 – Doors, Gates and Turnstiles:
  - The delayed egress locking system shall be installed and operated as follows (continued):
    - An attempt to egress shall initiated an irreversible process that allows such egress in not more than 15 seconds when a physical effort to exit is applied for not more than 3 seconds. Initiation of the irreversible process shall initiate an audible signal in the vicinity of the door. Manual reset is required.
      - Exception: Where approved, a delay of not more than 30 seconds is permitted on a delayed egress door.

1010.2.13.1

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1010 – Doors, Gates and Turnstiles:
  - The delayed egress locking system shall be installed and operated as follows (continued):
    - The egress path from any point shall not pass through more than one delayed egress locking system.
      - Exceptions:
      - In I-1, Condition 2, I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
      - In Group I-1 Condition 1, or I-4 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds and the building is equipped throughout by an automatic sprinkler system.

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1010 – Doors, Gates and Turnstiles:
  - Controlled egress doors in Groups I-1 and I-2 shall be permitted to be locked in means of egress where the clinical needs of persons receiving care require their containment. Controlled egress doors shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system or an approved automatic smoke detection system providing that the doors are installed and operate as follows:
    - The door locks shall unlock on actuation of the automatic sprinkler system or automatic fire detection system.
    - The door locks shall unlock on loss of power controlling the lock or lock mechanism.
    - The door locking system shall be installed to have the capability of being unlocked by a switch located at the fire command center, a nursing station, or other approved location. The switch shall directly break power to the lock.

1010.2.14

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1010 – Doors, Gates and Turnstiles:
  - Controlled egress door operation (continued):
    - A building occupant shall not be required to pass through more than one door equipped with controlled egress locking system before entering an exit.
    - The procedures for unlocking doors shall be part of the emergency planning and preparedness required by Chapter 4 of the IFC.
    - All clinical staff shall have keys, codes or other means necessary to operate the locking system.
    - The door locking system shall be listed in accordance with UL 294.

1010.2.14

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1023 – Interior Exit Stairways and Ramps:
  - Penetrations into or through interior exit stairways or ramps are prohibited except for the following:
    - Equipment and ductwork necessary for independent ventilation or pressurization.
    - Fire protection systems.
      - Definition (Chapter 20): *Approved devices, equipment, or systems used to detect a fire, activate an alarm, extinguish or control a fire, control or manage smoke and products of a fire or any combination thereof.*
    - Security systems.
    - Two-way communications systems.
    - Electrical raceway for fire department communication systems.

1023.5

2021 Michigan Building Code (MBC)

Chapter 10 – Means of Egress:

- Section 1023 – Interior Exit Stairways and Ramps:
  - Penetrations into or through interior exit stairways or ramps are prohibited except for the following (continued) :
    - Electrical raceway serving the interior exit stairway and ramp and terminating at a steel box not exceeding 16 square inches.
  - Such penetrations shall be protected in accordance with Section 714 (Penetrations). There shall not be penetrations or communication openings, whether protected or not, between adjacent interior exit stairways and ramps.

1023.5

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Michigan Building Code (MBC), 2021 Edition
Chapter 27 - Electrical

2021 Michigan Building Code (MBC)

Chapter 27 – Electrical:

- Section 2702 – Emergency and Standby Power Systems:
  - Standby power shall be provided for in-building two-way emergency responder communication coverage systems required by Section 918.
    - The standby power supply shall be capable of operating the system at 100% system operation capacity for a duration of not less than 12 hours.
  - EVACS standby power shall be provided in accordance with NFPA 72.
  - Gas detection systems shall be provided with emergency or standby power in accordance with the IFC.

2702.2.3, 2702.2.4, 2702.2.7

END OF PERIOD 3 – MODULE 6

Period 3 Conclusion

- This concludes Period 3 of the apprenticeship program.
- The test will consist of questions about the material covered in Period 3 and will include questions from ***both*** the Michigan Building Code, 2021 Edition and the PowerPoint presentations.
- Apprentices will need a passing score on the test as well as their supervisor's approval to graduate from Period 3 of the program.