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ASSOCIATION OF MICHIGAN

APPRENTICESHIP PROGRAM

Period 3
Related Training Instruction (RTI)
Module 2 – Michigan Building Code (MBC), Chapters
3, 4 and 7

Reading material associated with this module:
Chapters 3, 4, and 7
Michigan Building Code (MBC), 2021 Edition

**Michigan Building Code (MBC), 2021
Edition
Chapter 3 – Occupancy Classification and
Use**

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 301 – Scope:
 - The provisions of this section shall control the classification of all buildings and structures as to occupancy and use. Different classifications of occupancy and use represent differing degrees of hazard and risk to building occupants.

301.1

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 303 – Assembly Group A:
 - Assembly Group A occupancy includes the use of a building or structure for the gathering of persons for various purposes:
 - A building or tenant space for assembly purposes with an occupant load less than 50 shall be classified as Group B.
 - A room or space for assembly purposes with an occupant load less than 50 and accessory to another occupancy shall be classified as Group B or as part of that occupancy.
 - A room or space for assembly purposes that is less than 750sf in area and accessory to another occupancy shall be classified as Group B or as part of that occupancy.

303.1, 303.1.1, 303.1.2

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 303 – Assembly Group A:
 - Assembly Group A occupancy includes the use of a building or structure for the gathering of persons for various purposes (continued):
 - A room or space for assembly purposes that is associated with a Group E (educational) occupancy is not considered a separate occupancy.
 - Accessory religious educational rooms and religious auditoriums with occupant loads less than 100 per room or space are not considered separate occupancies.
 - Assembly Group A-1: Fixed seating for viewing motion pictures or performing arts.
 - Assembly Group A-2: Food and/or drink consumption.
 - Assembly Group A-3: Worship, recreation or amusement.
 - Assembly Group A-4: Spectator seating for indoor sporting events and activities.
 - Assembly Group A-5: Participation or viewing of outdoor activities.

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Chapter 3 – Occupancy Classification and Use:

- Section 304 – Business Group B:
 - Business Group B occupancy includes the use of a building or structure for office, professional or service-type transactions including storage of records and accounts. Specific Group B occupancies may require compliance with special sections:
 - Airport traffic control towers shall comply with Section 412.2.
 - Ambulatory care facilities shall comply with Section 422.
 - Higher education laboratories shall comply with Section 428.
- Section 305 – Educational Group E:
 - Educational Group E occupancy includes the use of a building or structure by 6 or more persons at any one time for educational purposes through the 12th grade.

304.1, 304.2, 304.3, 304.4, 305.1

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 305 – Educational Group E:
 - Educational Group E occupancy includes the use of a building or structure by 6 or more persons at any one time for educational purposes through the 12th grade (continued):
 - Religious educational rooms and auditoriums, which are accessory to places of worship and have occupant loads less than 100 per room or space shall be classified as Group A-3.
 - Group E day care facilities include buildings or structures, or portions thereof occupied by more than 5 children, older than 2 ½ years who receive educational, supervision, or personal care services for less than 24 hours per day.
 - Rooms and spaces within places of worship providing day care during religious functions are classified as part of the primary occupancy.
 - Facilities with 5 or less children receiving day care shall be classified as part of the primary occupancy.

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 305 – Educational Group E:
 - Group E day care facilities include buildings or structures, or portions thereof occupied by more than 5 children, older than 2 ½ years who receive educational, supervision, or personal care services for less than 24 hours per day (continued):
 - A facility such as the above within a dwelling unit having 5 or fewer children receiving such day care shall be classified as a Group R-3 occupancy or shall comply with the International Residential Code.
 - Storm shelters shall be provided for Group E occupancies where required by Section 423.5.

305.2.3, 305.3

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 306 – Factory Group F:
 - Factory Group F occupancy includes the use of a building or structure, or portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair, or processing operations that are not classified as Group H hazardous or Group S storage.
 - Group F is further subdivided into moderate-hazard factory industrial Group F-1 and low-hazard factory industrial Group F-2. Group F-2 includes industrial uses that involve the fabrication or manufacturing of non-combustible materials that, during finishing, packing, or processing do not involve a significant fire hazard. Examples include:
 - Beverages up to 16% alcohol content
 - Brick and masonry / ceramic products / glass products
 - Foundries / fabrication and assembly of metal products
 - Aircraft manufacturing shall comply with Section 412.6.

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 307 – Hazardous Group H:
 - Hazardous Group H occupancy includes the use of a building or structure, or portion thereof, that involves the manufacturing, processing, generation, or storage of materials that constitute a physical or health hazard in quantities in excess of those allowed in control areas complying with Section 414, based on the maximum allowable quantity limits for control areas set forth in Tables 307.1(1) and 307.1(2).
 - Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4, and H-5 in accordance with Sections 307 and 415 and the International Fire Code.
 - There are a number of areas that store, use, or handle hazardous materials described in Section 307.1.1 that are not classified as Group H but classified as the occupancy they most nearly resemble.
 - Hazardous materials in any quantity shall conform to the requirements of this code, Section 414, and the International Fire Code.

307.1, 307.1.1, 307.2

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 307 – Hazardous Group H:
 - Hazardous Group H occupancies are classified as follows:
 - High-hazard Group H-1: Buildings and structures containing materials that pose a detonation hazard.
 - High-hazard Group H-2: Buildings and structures containing materials that pose a deflagration or accelerated burning hazard.
 - High-hazard Group H-3: Buildings and structures containing materials that readily support combustion or that pose a physical hazard.
 - High-hazard Group H-4: Buildings and structures containing materials that are health hazards.
 - High-hazard Group H-5: Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials (HPM) are used with a quantity in excess as allowed by Tables 307.1(1) and 307.1(2).

307.3, 307.4, 307.5, 307.6, 307.7

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 308 – Institutional Group I:
 - Institutional Group I occupancy includes the use of a building or structure, or portion thereof, in which care or supervision is provided to persons who are or are incapable of self-preservation without physical assistance or in which persons are detained for correction purposes or in which the liberty of the occupants is restricted.
 - Institutional Group I occupancies are classified as follows:
 - Institutional Group I-1: Buildings, structures, or portions thereof, for more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised environment and receive custodial care. This classification is further defined as Condition 1 in which **all** persons under custodial care are capable of evacuation without any assistance and Condition 2 in which there are **any** persons who require limited verbal or physical assistance to complete evacuation.

308.1, 308.2, 308.2.1, 308.2.2

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 308 – Institutional Group I:
 - Institutional Group I occupancies are classified as follows (continued):
 - A facility housing not less than 6 and not more than 16 persons receiving custodial care shall be classified as Group R-4.
 - A facility with 5 or fewer persons receiving custodial care shall be classified as Group R-3 or shall comply with the International Residential Code (Michigan Residential Code) provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or Section P2904 of the MRC.

308.2.3, 308.2.4

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 308 – Institutional Group I:
 - Institutional Group I occupancies are classified as follows (continued):
 - Institutional Group I-2: Buildings and structures used for medical care on a 24-hour basis for more than 5 persons who are incapable of self-preservation.
 - This classification is further defined as Condition 1, which are facilities that provide nursing and medical care but do not provide emergency care, surgery, obstetrics, or in-patient stabilization for psychiatric or detoxification, including but not limited to, nursing homes and foster care facilities and Condition 2, which are facilities that provide nursing and medical care and could provide emergency care, surgery, obstetrics, or in-patient stabilization for psychiatric or detoxification, including but not limited to, hospitals.
 - Buildings of Group I-2 shall comply with Section 407.

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Chapter 3 – Occupancy Classification and Use:

- Section 308 – Institutional Group I:
 - Institutional Group I occupancies are classified as follows (continued):
 - Institutional Group I-3: Buildings and structures that are inhabited by more than 5 persons who are under restraint or security. A Group I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants' control.
 - This classification is further defined by 5 conditions as follows:
 - Condition 1 includes buildings in which free movement is allowed from sleeping areas, and other spaces where access or occupancy is permitted, to the exterior through means of egress without restraint.
 - Condition 2 includes buildings in which free movement is allowed from sleeping areas, and any other occupied smoke compartment, to one or more other smoke compartments. Egress to the exterior is impeded by locked exits.

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 308 – Institutional Group I:
 - Institutional Group I occupancies are classified as follows (continued):
 - This classification is further defined by 5 conditions as follows:
 - Condition 3 includes buildings in which free movement is allowed within individual smoke compartments, such as within a residential unit composed of individual sleeping units and group activity spaces, where egress is impeded by remote-controlled release of means or egress from such a smoke compartment to another smoke compartment.
 - Condition 4 includes buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

308.4.3, 308.4.4

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 308 – Institutional Group I:
 - Institutional Group I occupancies are classified as follows (continued):
 - This classification is further defined by 5 conditions as follows:
 - Condition 5 includes buildings in which free movement is restricted from an occupied space. Staff-controlled manual release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

308.4.5

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 308 – Institutional Group I:
 - Institutional Group I occupancies are classified as follows (continued):
 - Institutional Group I-4: Buildings and structures occupied by more than five persons of any age who receive custodial care for fewer than 24 hours per day by persons other than parents or guardians; relatives by blood, marriage, or adoption; and in a place other than the home of the person cared for, e.g., adult day care and child day care.

308.5

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 309 – Mercantile Group M:
 - Mercantile Group M occupancy includes buildings and structures for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and where the public has access.
 - The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored or displayed in a single control area shall not exceed the quantities listed in Table 414.2.5(1).
 - Motor fuel-dispensing facilities shall comply with Section 406.7.

309.1, 309.2, 309.3

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 310 – Residential Group R:
 - Residential Group R occupancy includes the use of a building or structure, or portion thereof, for sleeping purposes when not classified as a Group I or not regulated by the International Residential Code (Michigan Residential Code).
 - Residential Group R occupancies are classified as follows:
 - Residential Group R-1 occupancies containing sleeping units where the occupants are primarily transient in nature, e.g., hotel, motel.
 - Residential Group R-2 occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, e.g., apartments, fraternities / sororities, vacation timeshare properties.

310.1, 310.2, 310.3

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 310 – Residential Group R:
 - Residential Group R occupancies are classified as follows:
 - Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as R-1, R-2, R-4, or I, including buildings not containing more than two dwelling units, care facilities for fewer than 5 persons receiving care, nontransient congregate living facilities with 16 or fewer residents, transient congregate living facilities for 10 or fewer occupants, or transient lodging houses with 5 or fewer guest rooms and 10 or fewer occupants.

310.4

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 310 – Residential Group R:
 - Residential Group R occupancies are classified as follows:
 - Residential Group R-4 occupancies shall include buildings, structures, or portions thereof for more than 5 but not more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised residential environment and receive custodial care, e.g., alcohol and drug centers, assisted living facilities, halfway houses. Two conditions are defined for R-4 occupancies as follow, Condition 1 in which **all** persons under custodial care are capable of evacuation without any assistance, and Condition 2 in which there are **any** persons who require limited verbal or physical assistance to complete evacuation.

310.5, 310.5.1, 310.5.2

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 311 – Storage Group S:
 - Storage Group S occupancy includes the use of a building or structure, or portion thereof, for storage that is not classified as a hazardous occupancy.
 - A room or space used for storage purposes that is accessory to another occupancy shall be classified as part of that occupancy.
 - High-piled stock or rack storage, or attic, under-floor and concealed spaces used for storage of combustible materials shall be in accordance with Section 413.
 - Moderate-hazard storage Group S-1 includes storage of, but not limited to, Levels 2 and 3 aerosol products, books and paper in rolls or packs, cardboard and cardboard boxes, furniture, and lumber.
 - Low-hazard storage Group S-2 includes buildings used for the storage of non-combustible materials such as products on wood pallets or in paper cartons or in paper wrappings.

2021 Michigan Building Code (MBC)

Chapter 3 – Occupancy Classification and Use:

- Section 311 – Storage Group S:
 - Moderate-hazard Group S-1:
 - Aircraft hangars used for storage or repair shall comply with Section 412.3.
 - Motor vehicle repair garages shall comply with Section 406.8.
 - Low-hazard Group S-2:
 - Public parking garages shall comply with Section 406.4 and the additional requirements of 406.5 for open parking garages or Section 406.6 for enclosed parking garages.

311.2.1, 311.2.2, 311.3.1

**Michigan Building Code (MBC), 2021
Edition**

**Chapter 4 – Special Detailed
Requirements Based on Occupancy and
Use**

2021 Michigan Building Code (MBC)

Chapter 4 – Special Detailed Requirements Based on Occupancy and Use:

- In addition to the occupancy and construction requirements in this code, the provisions of this chapter apply to the occupancies and use described:
- Section 402 - Covered Mall Buildings:
 - Atriums connecting three or more stories in a covered mall building shall be provided with a smoke control system in accordance with Section 909.
 - Buildings exceeding 50,000 sq. ft. within either a covered mall building or within the perimeter line of an open mall building shall be equipped with an emergency voice/alarm communications system in compliance with Section 907.5.2.2 and NFPA 72.

410.1, 402.7.2, 402.7.4

2021 Michigan Building Code (MBC)

Chapter 4 – Special Detailed Requirements Based on Occupancy and Use:

- Section 403 – High-Rise Buildings:
 - Section 403 applies to buildings more than 55’ above the lowest level of fire department vehicle access (Michigan).
 - High-rise buildings are required to be equipped with:
 - Smoke detection in accordance with Section 907.2.13.1.
 - A fire alarm system in accordance with Section 907.2.13.
 - An emergency voice/alarm system in accordance with Section 907.5.2.2.
 - In-building, two-way emergency responder communication coverage provided in accordance with Section 510 of the International Fire Code (IFC).
 - A fire command center complying with Section 911 shall be provided in a location approved by the fire code official.

403.1, 403.4.1, 403.4.2, 403.4.4, 403.4.5, 403.4.6

2021 Michigan Building Code (MBC)

Chapter 4 – Special Detailed Requirements Based on Occupancy and Use:

- Section 404 – Atriums:
 - A fire alarm system shall be provided in buildings with an atrium (as defined below) in accordance with Section 907.2.14.
 - *Atrium: A vertical space, closed at the top connecting two or more stories in a Group I-2 or I-3 occupancy, or three or more stories in any other occupancy.*
- Section 407 – Group I-2:
 - Numerous specific fire alarm system and automatic detection location requirements are contained within Section 407. A fire alarm systems is required in accordance with Section 907.2.6.
- Section 408 – Group I-3:
 - A fire alarm system shall be provided in accordance with Section 907.2.6.3.

404.4, 407, 408.10

2021 Michigan Building Code (MBC)

Chapter 4 – Special Detailed Requirements Based on Occupancy and Use:

- Section 406 – Repair Garages:
 - Repair garages used for repair of vehicles fueled by non-odorized gases including, but not limited to hydrogen and non-odorized LNG, shall be provided with a non-odorized gas detection system that, when activated, will perform the following:
 - Activate distinct audible and visual alarms in the garage, where ventilation system is interlocked with the gas detection.
 - Deactivate all heating systems.
 - Activate the mechanical ventilation system where interlocked with the gas detection.
 - Failure of the gas detection system will deactivate all heating systems, activate the mechanical ventilation system and cause a trouble to sound at an approved location.

406.8.2, 406.8.2.1, 406.8.2.2

2021 Michigan Building Code (MBC)

Chapter 4 – Special Detailed Requirements Based on Occupancy and Use:

- Section 410 – Stages, Platforms, and Technical Production Areas:
 - Proscenium fire curtains installed in compliance with NFPA 80 *Fire Doors and Other Opening Protectives*, shall be activated by ultra-fast rate of rise heat detectors in accordance with FM 3210 *Heat Detectors for Automatic Fire Alarm Signaling*, provided at the roof deck or at the ceiling, if provided, on the stage side of the proscenium wall.
- Section 411 – Special Amusement Areas:
 - Buildings containing special amusement areas shall be equipped an automatic smoke detection system in accordance with Section 907.2.12.
 - An emergency voice/alarm communications system shall be provided in accordance with Section 907.2.12.
 - An option of the 3 allowable for puzzle room exiting is that exits shall be open and readily available upon activation by the automatic fire alarm system, automatic sprinkler system, and a manual control at a constantly attended location.

410.2.5, NFPA 80 2019 Edition – 20.7.3.2, 411.3, 411.4, 411.5

2021 Michigan Building Code (MBC)

Chapter 4 – Special Detailed Requirements Based on Occupancy and Use:

- Section 411 – Special Amusement Areas:
 - Required directional exit marking shall be activated by the fire alarm and automatic sprinkler system in accordance with Section 907.2.12.
- Section 412 – Aircraft-Related Occupancies:
 - Aircraft traffic control towers shall be equipped with an automatic smoke detection system installed in accordance with Section 907.2.22.
 - A fire command center shall be provided where the control cab is located more than 75' above the lowest level of fire department vehicle access. The fire command center shall comply with Section 911.
 - Residential aircraft hangers shall be provided with smoke **alarms** in accordance with Section 907.2.22.

411.6, 412.2.3.1, 412.2.3.2, 412.4.3

2021 Michigan Building Code (MBC)

Chapter 4 – Special Detailed Requirements Based on Occupancy and Use:

- Section 415 – Groups H-1, H-2, H-3, H-4 and H-5:
 - Group H occupancies shall be provided with an automatic fire detection system in accordance with Section 907.2.
 - Emergency alarms for the detection and notification of an emergency condition in Group H occupancies shall be provided as follows:
 - An alarm initiating and notification system shall be provided in buildings, rooms, or areas used for storage of hazardous materials, dispensing, use and handling. The emergency alarm system shall be electrically supervised and monitored by an approved central, proprietary or remote station service or shall initiate an audible and visual signal at a constantly attended on-site location.
 - Emergency alarm systems shall be provided with emergency or standby power in accordance with Section 2702.2.

415.3, 415.5, 415.5.1, 415.5.2, 415.5.3, 415.5.4

2021 Michigan Building Code (MBC)

Chapter 4 – Special Detailed Requirements Based on Occupancy and Use:

- Section 420 – Groups I-1, R-1, R-2, R-3, and R-4:
 - Fire alarm systems and smoke alarms shall be provided in Group I-1, R-1, and R-2 occupancies in accordance with Sections 907.2.6, 907.2.8, and 907.2.9, respectively.
 - Single- or multiple-station smoke alarms shall be provided in Groups I-1, R-2, R-3, and R-4 in accordance with Section 907.2.11.
 - Additional smoke detection requirements for Group I-1 assisted living housing units are included in Section 420.7.
- Section 422 – Ambulatory Care Facilities:
 - A fire alarm system shall be provided for ambulatory care facilities in accordance with Section 907.2.2.

420.5, 420.7, 422.5

**Michigan Building Code (MBC), 2021
Edition
Chapter 7 – Fire and Smoke Protection
Features**

2021 Michigan Building Code (MBC)

Chapter 7 – Fire and Smoke Protection Features:

- The provisions of this chapter govern the materials, systems, and assemblies used for structural fire resistance and fire-resistance-rated construction separation of adjacent spaces to safeguard against the spread of fire and smoke.
- Through penetrations of fire-resistance-rated walls shall comply with one of the following:
 - Through penetrations shall be protected using systems installed as tested in the approved fire-resistance-rated assembly.
 - Through penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with ASTM E814 or UL 1479 with a minimum positive pressure differential of 0.01” of water and shall have an F rating of not less than the required fire-resistance rating of the wall penetrated.

701.1, 714.4.1, 714.4.1.1, 714.4.1.2

2021 Michigan Building Code (MBC)

Chapter 7 – Fire and Smoke Protection Features:

- Exception: Where the penetrating items are steel, ferrous, or copper pipes, tubes, or conduits, the annular space between the penetrating item and the fire-resistance-rated wall is permitted to be protected by either of the following measures:
 - In concrete or masonry walls where the penetrating item is a maximum 6” nominal diameter and the area of the opening through the wall does not exceed 144sq. in., concrete, grout, or mortar is permitted where installed full thickness of the wall or the thickness required to maintain the fire-resistance rating.
 - The material used to fill the annular space shall prevent the passage of flame and hot gases per ASTM E119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01” of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

714.4.1

END OF PERIOD 3 – MODULE 2

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