

# BFAAM Apprenticeship Program

Period 4

Related Training Instruction (RTI)

Module 1 – NFPA 70 –

Reading material associated with this  
module: Introduction, Chapter 1 & Article 760  
of NFPA 70, *National Electrical Code (NEC)*,  
2014 edition

# National Electric Code Introduction

- The National Electric Code (NEC) is a “CODE” for the installation of electrical conductors, equipment, & raceways; signaling and communications conductors, equipment, & raceways; and optical fiber cables & raceways for buildings and structures for public and private use.

# National Electric Code Introduction

- The State of Michigan adopts the NEC as the "CODE" for Electrical Installations.
- In Reference to the Michigan Building Code Section 907 Fire Alarm and Detection Systems.
- 907.6.1 Wiring. Wiring shall comply with the requirements of NFPA 70 (NEC) and NFPA 72 (Fire Alarm Code).

# National Electric Code Introduction

- In Reference to NFPA 72 National Fire Alarm Code, several requirements refer to NFPA 70 NEC.
- 4.4.1.2 Code Conformance. All power supplies shall be installed in conformity with the requirements of NFPA 70 NEC.
- 4.4.4.4 Wiring. The installation of all wiring, cable, and equipment shall be in accordance with NFPA 70 NEC, and specifically with Articles 760, 770, & 800, where applicable.

# National Electric Code Introduction

- Fire Alarm Systems are required to be installed within compliance of the NEC.
- An understanding of the purpose and organization of the National Electric Code is critical to any user who wants to properly interpret and apply its requirements. This understanding is even more critical to those who work in the specialty areas of the NEC in which limited energy circuits (as in fire alarm circuits) are covered by special rules that may alter the code requirements.

# National Electric Code Introduction

- **90.1 Purpose.**

- (A) Practical Safeguarding.**

The purpose of this code is the practical safeguarding of persons and property from hazards arising from the use of electricity.

Fire alarm circuits in common use today do not present a significant risk of fire or shock. In some cases a risk of shock is present, but the circuit involved would not normally be capable of starting a fire. Fire Alarm Systems utilize power sources that limit both voltage and current to minimize fire or shock hazards.

# National Electric Code Introduction

## ■ 90.2 Scope.

(A) Covered. This code covers the installation of electrical conductors, equipment, and raceways; signaling and communications conductors, equipment, and raceways; and optical fiber cables and raceways for the following:

- (1) Public and private premises including all buildings and structures.
- (3) Installation of conductors and equipment that connect to the supply of electricity.

# National Electric Code Introduction

## ■ 90.3 Code Arrangement.

The code is divided into the introduction and nine chapters. Chapters 1, 2, 3, and 4 apply generally; Chapters 5, 6, and 7 apply to special occupancies, special equipment, or other special conditions. These latter chapters supplement or modify the general rules. Chapters 1 through 4 apply except as amended by chapters 5, 6, and 7 for the particular conditions.

Chapter 8 covers communication systems and is not subject to the requirements of chapters 1 through 7 except where the requirement is specifically referenced in chapter 8.

Chapter 9 consists of tables that are applicable as referenced.



# National Electric Code Introduction

- In effect, then, section 90.3 provides the permission for the rules in chapters 5, 6, and 7 to change the rules in the first four chapters.
- This permission and an understanding of the code hierarchy is very important to anyone applying the NEC to fire alarm systems.

# National Electric Code Introduction

- **90.4 Enforcement.** The Code is intended for mandatory application by governmental bodies that exercise legal jurisdiction over electrical installations.
- Code Officials are commonly referred to as the “Authority Having Jurisdiction” (AHJ). The AHJ can be an organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

# National Electric Code Introduction

- **90.5(A) Mandatory Rules.** Mandatory rules of the code are those that identify actions that are specifically required or prohibited and are characterized by the use of the term *shall* or *shall not*.

# National Electric Code

## Article 760

- Fire Alarm System Requirements are found in Chapter 7, Article 760.
- Article 760 includes Part I – General, Part II – NPLFA, and Part III - PLFA
- Article 760 regulates installation of wiring and equipment, including all circuits controlled and powered by the fire alarm system (760.1)
- Article 300 requirements do not apply, unless specifically referenced by Article 760

# National Electric Code Application

- It is important to understand the difference between Non-Power-Limited Fire Alarm (NPFLA) and Power-Limited Fire Alarm (PLFA) circuits.
- These circuit differences will be discussed in further detail in a future module.

# National Electric Code Application

- Almost every circumstance you will come across as a “Fire Alarm System Technician” will involve (PLFA) wiring methods, materials and application.

# National Electric Code Application

- PLFA may be installed in compliance with 760.130(B), subject to:
  - Article 110.3(B) (installed per listed instructions)
  - Article 300.11(A) (securing and supporting)
  - Article 300.15 (boxes, conduit bodies, fittings - where required)
- Exposed or fished in concealed spaces.
- Supported at 18" intervals within 7' of floor.

# National Electric Code

## General Definitions

- Article 100 Definitions, it is important to familiarize yourself with the definitions as related to fire alarm systems and their installation.



# National Electric Code

## General Article 110

- Article 110 Requirements for Electrical Installations.
- **Article 110.3 (B) Installation and Use.**  
Listed or labeled equipment shall be installed and used in accordance with any instruction included in the listing or labeling.

# National Electric Code

## General Article 110

- **110.6 Conductor Sizes.** Conductor sizes are expressed in American Wire Gage (AWG) or in circular mils.
- **110.7 Wiring Integrity.** Completed wiring installations shall be free from short circuits, ground faults, or any connections to ground other than as required or permitted elsewhere in the Code.

# National Electric Code

## General Article 110

- **110.8 Wiring Methods.**

Only wiring methods recognized as suitable are included in the code. The recognized methods of wiring shall be permitted to be installed in any type of building or occupancy.

# National Electric Code

## General Article 110

- **110.12 Mechanical Execution of Work.** Electrical equipment shall be installed in a neat and workmanlike manner.

# National Electric Code

## General Article 110

- **110.26 (A) Working Space.**

Working space for equipment operating at 600 volts, nominal, or less to ground and likely to require examination, adjustment, servicing or maintenance while energized shall comply with the dimensions of 110.26(A) (1), (A) (2), and (A) (3) or as required or permitted elsewhere in the code.

# National Electric Code

## General Article 110

- **110.26 (A)(1) Depth of Working Space.** According to Table 110.26 (A)(1) equipment operating at 0-150 volts, nominal to ground would require a 3 ft. depth of working space, however (A)(1)(b) states:
- **(b) Low Voltage.** By special permission, smaller working space shall be permitted where all exposed live parts operate at not greater than 30 volts rms, 42 volts peak, or 60 volts dc.

# National Electric Code

## General Article 110

- **110.26 (A)(2) Width of Working Space.**  
The width of the working space in front of the electrical equipment shall be the width of the equipment or 30 inches, whichever is greater. In all cases, the work space shall permit at least a 90 degree opening of equipment doors or hinged panels.

# National Electric Code

## General Article 110

- **110.26(A)(3) Height of Working Space.**  
The work space shall be clear and extend from the grade, floor, or platform to the height required by 110.26(E). Within the height requirement of this section, other equipment that is associated with the electrical installation and is located above or below the electrical equipment shall be permitted to extend not more than 6 inches beyond the front of the electrical equipment.



# **BFAAM Apprenticeship Program**

Period 4

Reading Assignment for  
Module 22 – NFPA 70 NEC –

Reading material associated with this  
module: Chapter 7, Article 760 of NFPA 70,  
*National Electrical Code*, 2008 /2011 edition