BFAAM Apprenticeship Program

Period 2
Related Training Instruction (RTI)
Module 6 – NFPA 72 – Inspection, Testing and Maintenance
Reading material associated with this module: Chapter 14 of NFPA 72, *National Fire Alarm Code,* 2013 edition

Test & Maintenance General

- Requirements apply to all systems, including single/multiple station smoke alarms and household fire alarms 14.1.1, .2
- Requirements apply to new and existing systems 14.1.4

Test & Maintenance General

- The purpose of initial and reacceptance inspections is to verify compliance with code requirements and approved plans 14.2.1.1
- The purpose of testing is to ensure system operation as designed 14.2.1.2
- System deficiencies shall be corrected 14.2.2.2.2

Test & Maintenance General

- Building owner shall be responsible for inspection, testing and maintenance of the fire alarm system 14.2.3.1
- Inspection, testing and maintenance shall be permitted to be done by other than the owner if conducted under a written contract 14.2.3.3

Test & Maintenance General

- Service personnel shall be experienced and qualified. Examples are:
  - Factory trained and certified on the specific type and brand of system
  - Certified by a nationally recognized fire alarm certification organization
  - Registered, licensed or certified by a state or local authority
  - Employed by an organization listed by a NRTL for the servicing of fire alarms 14.2.3.6 & 10.5.3.3

Test & Maintenance General

- Notification of testing shall be made to all persons and facilities receiving signals and to all building occupants 14.2.4.1
- When testing fire suppression releasing systems, testing personnel shall be qualified and experienced in the specific arrangement of a suppression system 14.2.6.1

Test & Maintenance General

- Visual inspections shall be performed per Table 14.3.1 for the purpose of verifying there have been no changes that affect equipment performance 14.3.1
- Frequency for VI ranges from weekly for non-monitored control equipment to annually for monitored control equipment. Most components are semi-annual Table 14.3.1

Test & Maintenance General

- Acceptance testing - all new systems shall be inspected and tested per Chapter 14. No devices are exempted from acceptance testing (100% test) 14.4.1.1
- The Authority Having Jurisdiction shall be notified prior to the initial acceptance test 14.4.1.2

Test & Maintenance General

- Reacceptance testing - requires testing under the following conditions:
  - Adding a device (test new device)
  - Deleting a device (test other devices on ckt)

14.4.2

Test & Maintenance General

- Reacceptance testing - requires testing under the following conditions:
  - Modification or repair to control unit (test panel functions and indicators)
  - Changes made to field programming (test all devices affected by program changes, and 10% (up to 50) of devices not directly affected by the program change)

14.4.2

Test & Maintenance General

- Reacceptance testing - requires testing under the following conditions:
  - Changes made to executive software, aka firmware and operating system, (10% system test, including at least one device on each input and output circuit, and verification of notification appliance and off-premise reporting capabilities)

14.4.2.5

Test Methods/Frequency Table 14.4.3.2

- #2 - Control equipment Connected to a supervising station shall be tested annually
- #6 - Engine driven generator (Central Station) - monthly testing

Test Methods/Frequency Table 14.4.3.2

- #9 - Batteries
  - Sealed lead acid batteries used in fire alarm systems shall be tested semiannually (load voltage test) and annually (charger test, discharge test)

Test Methods/Frequency Table 14.4.3.2

- #15 - metallic conductors shall be tested for stray voltage (1V AC/DC max), ground fault isolation, short circuit faults, loop resistance shall be measured and recorded (and within manufacturers specs), and circuit integrity

Test Methods/Frequency Table 14.4.3.2

- #16 - non-metallic (fiber optic) conductors shall be tested for power loss, and the value recorded in the FACP

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices tested annually, with some exceptions
  - Restorable fixed temperature, spot type heat detectors - at least two on each circuit shall be tested annually
  - Different detectors shall be tested each year, with all detectors tested within 5 years

14.4.4.5

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices tested annually, with some exceptions
  - Radiant energy fire detectors, semiannually
  - Waterflow, semiannually

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices
  - Restorable heat detectors shall be tested with a heat source per manufacturers instructions
  - Nonrestorable heat detectors shall be replaced after 15 years, or 2% shall be laboratory tested. If testing is selected over replacement, it shall be repeated every 5 years

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices
  - Smoke detectors shall be tested in place to ensure smoke entry, using smoke, listed aerosol approved by the manufacturer, or other methods listed in the manufacturers instruction manual

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices - Smoke detectors and smoke alarms shall be tested to ensure they are within the listed sensitivity range using one of:
  - Calibrated test method
  - Calibrated test instrument
  - Listed control equipment for sensitivity testing
  - Monitored sensitivity (trouble on drift)
  - Other calibrated test method approved by AHJ

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices - Smoke detectors shall be tested to ensure they are within the listed sensitivity unless they are used in a one or two family dwelling. Testing shall be within one year of installation and every alternate year thereafter 14.4.4.3
- Smoke alarms shall be tested monthly per the manufacturers instructions 14.4.5

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices - Smoke detectors
  - Air sampling detectors shall have alarm response verified from the end port on each run, and airflow verified at each sample port per the manufacturers instruction manual
  - Duct detectors shall be tested or inspected to ensure the airstream is being sampled, per the manufacturers instruction manual

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices - Smoke detectors
  - Projected beams shall be tested by introducing smoke/aerosol or an optical filter into the beam path
  - Smoke/heat detectors shall have each element tested independently
  - Smoke detectors which control outputs shall be verified with all initiating devices connected to the same circuit in alarm

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices - Sprinkler supervisory
  - Valves shall be operated
  - Pressure switches shall be operated
  - Room temperature and water temperature switches shall be operated
  - Water level switches shall be operated

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices - Sprinkler flow
  - Water shall be flowed through the inspectors test connection for wet systems
  - Inspectors test connection shall have a water flow rate equal to that of the smallest orifice sprinkler head on the system
  - Alarm test bypass connection shall be operated for dry, pre-action and deluge systems

Test Methods/Frequency Table 14.4.3.2

- #17 - Initiating devices - Multi-sensor or multi-criteria detectors
  - Each detection principle shall be tested independently
  - Testing shall be by introduction of physical phenomena to sensor(s)
  - If individual sensors cannot be tested individually, the primary sensor shall be tested

Test Methods/Frequency Table 14.4.3.2

- #22 - Notification Appliances - Audible
  - Sound pressure level (dBA) shall be measured and recorded throughout protected area
  - Sound pressure level (dBA) in alarm condition shall be measured and recorded
  - Where voice messages are used, they shall be distinguishable and understandable

Test Methods/Frequency Table 14.4.3.2

- #22 - Notification Appliances - Visible
  - Strobe locations shall be verified with approved drawings
  - Floor plan shall be verified with approved drawings to determine if there have been modifications affecting strobe coverage
  - Candela rating shall be verified with drawings
  - Operation of each device shall be verified

Test Methods/Frequency Table 14.4.3.2

- #4 - Supervising Station Systems
  - Operation of initiating device shall produce proper signal at SS within 90 seconds
  - DACT connection to two means of transmission shall be verified (unless exempted by connection to supervised line)
  - DACT shall be tested for line seizure by sending a signal while primary line is in use for a phone call

Test Methods/Frequency Table 14.4.3.2

- #4 - Supervising Station Systems - DACT
  - Primary line shall be disconnected, trouble signal must be indicated on premises and at SS within 4 minutes
  - Secondary line shall be disconnected, trouble signal must be indicated on premises and at SS within 4 minutes
  - Signal shall be initiated with primary line disconnected, verify transmission over secondary line

Test Methods/Frequency Table 14.4.3.2

- #27 - Supervising Station Systems - DACR
  - Each line shall be disconnected from the receiver, and a trouble signal verified
  - Each line shall be verified that a signal is received at least once every 6 hours

Test Methods/Frequency Table 14.4.3.2

- #24 – Emergency Control Functions
  - All emergency control functions (door holders, smoke dampers, AHU shutdown) shall be tested by creating or simulating an alarm condition

Test & Maintenance General

- Household fire alarm systems shall be tested at least annually 14.4.6.1
- Household fire alarm systems shall be maintained per the manufacturers instructions 14.4.6.2
- Smoke alarms in one and two family dwellings shall be replaced when operability test fails, or every 10 years 14.4.7.1

Test & Maintenance General

- Maintenance of fire alarm system equipment shall be in accordance with the manufacturers published instructions 14.5.1
- The frequency of maintenance and cleaning depends upon the type of equipment and local ambient conditions 14.5.2

Test & Maintenance Records

- After AHJ acceptance of the system, the owner shall be provided with:
  - Record drawings
  - Operation and Maintenance manuals
  - Written sequence of operations
  - A copy of the site specific software programming in electronic read only format

14.6

Test & Maintenance Records

- Inspection/testing records shall be retained until the next test + one year
- Inspection/testing records shall include:
  - Name of property, address, and date of test
  - Test frequency, name of person performing test, business address and phone number
  - Testing of all devices and sequence of operations
  - Other testing as required by manufacturer

14.6.2

Test & Maintenance Records

- Supervising Station records shall be maintained for one year, paper or electronic media is permitted. A hard copy of records shall be provided to the AHJ upon request

14.6.3

BFAAM Apprenticeship Program

Period 2
Reading Assignment for
Module 7 – NFPA 72 – Household Fire Alarm Systems
Reading material associated with this module: Chapter 29 of NFPA 72, *National Fire Alarm Code,* 2013 edition