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- Plans Review Considerations
  - NFPA 70 NEC
- Wiring Considerations
- Power Considerations
Primary Power Supply

- Primary power is provided by a dedicated branch circuit (120 VAC)

- Connected to low voltage transformer located in fire alarm control cabinet

- Generators are permissible
Primary Power Supply

- Circuit must be protected mechanical from damage
- Circuit breaker marked as “FIRE ALARM CIRCUIT”
- Protected from unauthorized access
- Overcurrent protection not exceeding 20 amps
Secondary Power

- Rechargeable batteries most common
  - 24 hour/5 minute rule
- Generators acceptable if automatically activated (with 4 hour battery back up)
- Must respond within 10 seconds of power loss
Secondary Power

- 24/4 for residential
- 7/4 rule if no commercial power supply available
- Recharged in 48 hours
- Battery “Issue” will cause trouble signal
Back Up Power Calculations

- Determine Battery Size
- Add up total stand by load
- Total Alarm load times 5 minutes
- 20% Safety Margin
Stand by Current

- All detectors (10) X 1mA = 10mA
- Control Device (1) X 200mA=200mA
- Failsafe Relays (4) X 50mA=200mA
- Annunciator (1) X 100mA=100mA

410mA or .41 A

.41 X 24=9.84AH
Alarm Current

- All detectors (10) X 50mA = 500mA
- Control Device (1) X 200mA = 200mA
- Relays in alarm (4) X 50mA = 200mA
- Annunciator (1) X 200mA = 200mA
- Horns/Strobes (10) X 50mA = 500mA

Total: 1600mA

1.6 A

1.6 X 0.083 = 0.13 AH
Battery Set Size

- Standby of 9.84AH + Alarm of .13AH = 9.97AH

- 9.97AH × .20 = 1.99AH + 9.97AH = 11.96
Calculating Voltage Drop

- Devices must be capable of performing between 85% and 110% of the primary and secondary voltage

- Function of Current and resistance
  - Resistance is function of conductor size and distance from source to load.
Voltage Drop Calculator

www.afaa.org
Battery Types

- **Vented lead acid**
  - Used in high current/extended standby time at lower currents

- **Sealed lead acid**
  - All gases sealed in and recycled
  - Most common

- **NiCad**
  - Used with low, consistent volt draws
Remotely Located Power Needs

- Must have its own Primary and secondary power
- Must be supervised
- Used to power remotely located NAC Power boosters, distributed voice evacuation amplifier
Basics

- Name, Scope etc.

- Scale 1/8” = 1 ‘

- Your job is to confirm
  - Devices all function per MFG or NFPA 72
  - Installed Per NFPA 70
Basics

- NFPA 170 Symbols

- Require FULL Fire Alarm System Diagrams including control unit, power supplies, battery chargers, and annunciators
Terms

- Fire Alarm Circuit
  - Either Power Limited or non power limited

- Abandoned Fire Alarm Cable
  - Not terminated at equipment and not tagged for future use
Terms

- Power Limited Fire Alarm Circuit (PLFA)
  - May use Class three transformer, Class three power supply or listed PLFA power supply

- Non Power limited Fire Alarm Circuit (NPLFA)-
  - Those meeting Article 760.41 and 760.43
  - Power source not more than 600 volts

- Fire Alarm Circuit Integrity (CI) Cable
  - Used to insure operation of Critical circuits
Installation Considerations

- Must pass thru walls in an “Approved” manner (Fire Barrier)

- Must be supported in cable trays or attached in manner to structure which does not damage cable

- Must be installed in a neat manner
• Circuits must be identifiable

• Power NEVER supplied thur a GFCI or AFCI

• All raceway, conduits, and wire must meet the intent of the NEC
  – Must only be used in the manner designed (not over amped, etc)
  – Fused where necessary
Careful around Air Handling Systems

- Specific Requirements on different types of air handling equipment

- Restrictions on wiring in ducts
  - Horizontal runs
References

- Design of Special Hazards and Fire Alarm Systems - 2nd Edition - Gagnon
- Fire Protection Systems - 2nd Edition - Jones
- NFPA Standard
Questions?