



**PDHonline Course E460 (2 PDH)**

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# **Designing to NFPA 731-2015, Electronic Security Systems**

*Instructor: Thomas Mason, PE*

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**PDH Online | PDH Center**

5272 Meadow Estates Drive  
Fairfax, VA 22030-6658  
Phone: 703-988-0088  
[www.PDHonline.com](http://www.PDHonline.com)

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NFPA 731 2015 SUMMARY,

**Standard for the Installation of Electronic Premises Security Systems**

TM, 15Oct14

CODE: Title, Standard, not Code
DISCUSSION: Consistent with recent trend at NFPA, this document emphasized that the enforcement comes through adoption by State or local government and the Authority Having Jurisdiction (AHJ).
ACTION ITEM: When writing a specification for a security system include the statement, "Installation, wiring, power supplies, detectors, readers, locking systems, video, duress, monitoring and documentation shall strictly follow NFPA 731-2015."

CODE: 1.2, Purpose - to define the terms used.
DISCUSSION: This is weird. NFPA usually publishes standards to protect the public and protect installers and maintainers. NFPA started out with the purpose of reducing insurance claims
ACTION ITEM: In your specification, state that the purpose of the system being installed is to protect the public, employees and property.

CODE: 1.3.6.1, One-and Two-Family Dwellings not covered
DISCUSSION: It is postulated that this exclusion was prompted by ADT and other home retailers wishing to avoid regulation of their industry.
ACTION ITEM: If you wish to use NFPA 731 for a one- or two-family dwelling, say in the specification, "Per strict interpretation of NFPA-731, excluding section 1.3.6.1."

CODE: 1.5 , Equivalency
DISCUSSION: The Standard specifically accepts alternative, if found to be equivalent.
ACTION ITEM: Invoke the Substitutions section of your specification boilerplate or say, NO EQUAL on items where you don't want substitution.

CODE: 1.5.2, Equivalency - Submit documentation to AHJ for acceptance.
DISCUSSION: In all cases, not just equivalency, the AHJ makes the final decision.
ACTION ITEM: At the end of the day, the measure of project success is getting a Building Permit, then an Occupancy Permit. Coordination with the AHJ is recommended.

CODE: 2.3.2, SIA Publications - ANSI / SIA CP-01 (control panels) and ANSI / PIR-01 (infra red detectors) shall be considered part of this Standard. [SIA = Security Industry Association – SIAonline.org
DISCUSSION: These Standards increase the reliability and reduce false alarms.
ACTION ITEM: Add these two references to your specification and check submittals for compliance.

CODE: 2.3.3, UL Publications – ANSI / UL 294(access control system units), ANSI / UL 606 (screens for burglar alarms), ANSI / UL 634 (connectors and switches for burglar alarms), ANSI / UL (holdup alarms),
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ANSI / UL 639 (intrusion detection units), ANSI / UL 827 (central alarm services), ANSI / UL 1076 (proprietary burglar alarms), ANSI / UL 2044 (commercial cctv) shall be considered part of this Standard. (UL = Underwriters Laboratories = UL.com)

DISCUSSION: These Standards increase the reliability and reduce false alarms.

ACTION ITEM: Add these two references to your specification and check submittals for compliance.

CODE: NFPA HB72-2013.10.1.2 ... NFPA 72 also does not address electronic intrusion detection systems, which are covered by NFPA 731, *Standard for the Installation of Electronic Premises Security Systems*.

DISCUSSION: The Fire Alarm Code specifically excludes security systems.

ACTION ITEM: If you are writing a spec for a combined Fire Alarm / Security system, it is important for you to reference both NFPA 72 and NFPA 731.

CODE: 3.2.2, 3, Labeled and Listed mean documentation satisfactory to the AHJ.

DISCUSSION: For many years, designers assumed that "listed" meant UL listed. The lawsuits, mentioned previously, caused NFPA to become very circumspect in this section.

ACTION ITEM: Require UL-listing in your specification if you think that provides higher quality and reliability.

CODE: 3.3.2, Active Lock – cannot be opened for egress by normal operation of door hardware

DISCUSSION: This introduces one of the stickiest design decisions, emergency egress vs access control. Almost always, a public AHJ will rule that emergency egress cannot be impeded. I have encountered a very few situations where the Plans Reviewer has issued an exemption in order to protect property.

ACTION ITEM: Do not install blocked path of emergency egress without thought and documented exemption.

CODE: 3.3.4, Annunciator - visual indication of status of circuits, conditions, systems or locations.

DISCUSSION: Historically, this was a light box with labeled windows. When something happened (an event) it was indicated by a latched light. Required were LAMP TEST, ACKNOWLEDGE and RESET. Today the function is performed by computers and screens.

ACTION ITEM: In your spec, identify points and events to be visually indicated and archived for later review.

CODE: 3.3.5, Asset Protection, Electronic Article Surveillance - property tags and location monitoring system.

DISCUSSION: Commonly observed in retail clothing and electronics stores.

ACTION ITEM: If you wish to include this capability, download vendor literature and choose features.

CODE: 3.3.9, Intrusion Detection and Sound Detection - Very generalized description of detection devices.

DISCUSSION: Intrusion detection includes motion detectors, pressure pads, door position switches, photocells and microwave beams. Sound detection is usually a microphone with a band filter to

selectively respond to glass break or such identified occurrence.

ACTION ITEM: Identify the protected material and place detection devices on plans around the material and on the paths of access and removal.

EXTENDED DISCUSSION: The philosophy of protection includes redundancy and verification. These add cost but increase confidence. The extreme I have encountered is “lock bolt position switch”. This is a limit switch in the locking mechanism or in the strikeplate which verifies that the lock bolt is engaged. Note that an electric hinge is required to convey circuit conductors into the door.

CODE: 3.3.10.1, Initiating Device - transmit a change-of-state condition

DISCUSSION: This term is used on fire alarms but not presently on security systems

ACTION ITEM: Identify the protected material and place detection devices on plans around the material and on the paths of access and removal.

CODE: 3.3.10.1.1, Ambush Alarm Initiating Device - signal indicating a forced disarming of an intrusion detection system

DISCUSSION: On home alarms, this is a disable code which also notifies the central office of duress.

ACTION ITEM: This is a standard software feature, but listing it in the specification avoids later recriminations.

CODE: 3.3.19.1.2, Duress Alarm Initiating Device - indicate a hostile situation

DISCUSSION: This is a hidden alarm button or “Man-Down Switch” available on walkie-talkies and as a stand-alone fob.

ACTION ITEM: Consider the value added by this security capability.

CODE: 3.3.10.1.3, Holdup Alarm Initiating Device - indicate a robbery has transpired

DISCUSSION: Very similar to the hidden alarm button or “Man-Down Switch”.

ACTION ITEM: Consider the value added by this security capability.

CODE: 3.3.10.2, Signaling Device - alarm, emergency or abnormal condition indicated by siren, bell, horn or strobe.

DISCUSSION: The Owner and his Security Specialist must decide the appropriate response to a security event. They may decide that alarm is best or only silent alarm to a central monitoring location. Most communities forbid direct notification to the police, because of false alarms.

ACTION ITEM: Implement the selected response.

CODE: 3.3.13, Foil - electrically conductive ribbon glued around window perimeters to initiate an alarm on glass break.

DISCUSSION: Almost totally obsolete. Expensive to maintain. Glass-break switches and glass-break microphones do the same thing better.

ACTION ITEM: Consider the value added by this security capability.

CODE: 3.3.15, Keypad - numeric or function keys to initiate an authorized request-to-enter via a coded string.

DISCUSSION: Standard implementation is to have a local control box which compares the code entered with an authorized list which can be updated as needed. A slimmer function is provided by a card reader, an RFID chip or SAW chip (these use a transponder and passive chip embedded in epoxy).

ACTION ITEM: This is inexpensive low-level security. Biometric authorization is replacing.

CODE: 3.3.16, Monitoring Station - remote facility that receives signals and has persons in attendance to respond

DISCUSSION: This definition does not reference the local, central control box which applies a stored program to respond to initiating events, as alarms and notification of the remote facility. They are referring to a formal remote facility manned by contractors, government or employed staff.

ACTION ITEM: Choose a location similar to the Fire Alarm Control Panel for the Security Panel. Consider the value added by central (remote) monitoring.

CODE: 3.3.17, Point ID - identity of a device by address or zone.

DISCUSSION: Security devices can be "hard-wired" or addressable (to use Fire Alarm terms). Hard-wired means that dedicated conductors extend from the control panel to each device. Addressable means that a common communications cable extends from the control panel to all devices (slightly simplified). Zone means grouping of devices to match areas on a display.

ACTION ITEM: Addressable is recommended as being cost effective initially and for future expansion.

CODE: 3.3.18, Position Sensor - indicates whether a portal is open or closed.

DISCUSSION: Much more valuable than this suggests. The magnetic or mechanical switch indicates FULLY CLOSED or NOT FULLY CLOSED. Thus, "cracked open" is reported, though not obvious.

ACTION ITEM: Use a door position switch with a keypad and electric latch or magnetic lock to verify operation.

CODE: 3.3.20, Prime Contractor - entity contractually responsible for providing services.

DISCUSSION: This is a subtle warning of our business environment. It is very common for one firm to sell the security service and subcontract delivery of the service to another firm. Legal liability may reside only with the contractual provider.

ACTION ITEM: Specify that the submittal indicate the actual provider of monitoring service and notification of change of the provider.

CODE: Protective wiring – use of wires which indicate intrusion by breaking an electrical circuit.

DISCUSSION:

ACTION ITEM: Consider the value added by this security capability.

CODE: 3.3.23, Record of Completion - document which indicates features, signed by the owner, installer, supplier, monitoring center and AHJ.

DISCUSSION: This is a Fire Alarm Concept. I have not seen it implemented on security jobs.

ACTION ITEM: Consider the value added by this security capability.

CODE: 3.3.24, Request to Exit (RTE) (RTX) - switch on protected side of door requesting release of lock without alarm.

DISCUSSION: The choice to the designer is to let panic hardware handle emergency egress and let the door position switch log it, or put in a RTX switch to release the lock and log it or put in a keypad or equivalent and log it.

ACTION ITEM: The RTX method is inexpensive, simple and widely adopted.

EXTENDED DISCUSSION: The designation "protected side" and "exposed side" is extremely valuable. Typically, great care is taken to conceal and protect wiring on the exposed side. In some situations, as the server room in a computer center, both sides are protected sides. Fortunately, if the hardware is installed, the application can be resolved (repeatedly) by software.

CODE: 3.3.26, Screens - An initiating device made up of fine wire which alarm upon being broken or shorting opposite polarity.

DISCUSSION: A better definition of screens is "burglar screens" on windows which harden entry to the point of near- impossibility.

ACTION ITEM: Consider the value added by this security capability.

CODE: 3.3.28, Alarm, Supervisory and Trouble Signals

DISCUSSION: These concepts are carried over from fire alarms and work well. In fact, all are digital communications with different software handling in the control panel

ACTION ITEM: Specify generation, monitoring, alarming and archiving each.

EXTENDED DISCUSSION: Alarm means unauthorized event; supervisory indicates a need for action, perhaps related to a guard tour, environmental or other nonintrusion point; trouble means a fault in a monitored circuit or component.

CODE: 3.3.31.2, Digital Imaging System (DIS) - video which can be viewed at or away from the protected premises.

DISCUSSION: A standard feature available on modern CCTV systems is that of acting like a LAN server. This provides real-time or archived images to remote browsers and smart phones.

ACTION ITEM: There is talk that access via smart phones provides safety benefits for guards. It is a no-cost addition, but must be approved by the Owner and hierarchy.

CODE: 3.3.32, Trap - device to initiate an alarm from opening a circuit, activating a pressure switch or movement of a wire or trip cord, as on an air conditioner.

DISCUSSION:

ACTION ITEM: Consider the value added by this security capability.

CODE: 3.3.34, Verification - duplicate information before action

DISCUSSION: Enhanced Call Verification (CV) two calls from the monitoring center; Multiple Trip Verification (MTV) two initiations before declaring an alarm; Remote Audio Verification (RAV) listening in after a notification to confirm activity present; Remote Video Verification (RVV) watching after notification to confirm activity present.

ACTION ITEM: Consider the value added by this security capability.

CODE: 4.1.2, Connection to Fire Alarm or other safety system

DISCUSSION: Then the security system must comply with the requirements of the other codes and standards.

ACTION ITEM: Accept a combined system if the integrator takes all liability. If you “roll your own” you also take enough liability that you have to defend yourself in Court if there is a later catastrophe.

CODE: 4.2.1, Listing of Equipment

DISCUSSION: The Standard requires listing in conformity with the Standard. Listing means documentation and usually, testing, to comply with the Standard.

ACTION ITEM: If you require compliance with the Standard (recommended) you are excluding all the cheap-and-dirty pieces and parts available on the internet. This may work hardship on local Contractors and require care in reviewing submittals.

CODE: 4.2.4, Prohibited equipment that appears to be Life Safety but isn't.

DISCUSSION: Some installers are providing security devices, as CCTV cameras and motion detectors, in enclosures that look like sprinkler heads or strobe / horns.

ACTION ITEM: The liability here is non-compliance as well as involvement in later catastrophe.

CODE: XX.xx.x.x, Listing by Underwriters Laboratories

DISCUSSION: This is the place where most NFPA standards explain the need for testing but that does not mean exclusively UL. Not here because security suppliers have worked hard to avoid required listing. That doesn't mean it is bad but does mean that you have lost one level of quality assurance.

ACTION ITEM: Do not require UL listing.

CODE: 4.3.1.1, Design Qualifications

DISCUSSION: Experience only is required, no vendor training. This is dangerous for a sophisticated system with complex software and many configuration choices.

ACTION ITEM: You can require manufacturer training, even manufacturer trained technician start-up.

CODE: 4.3.1.2, System Designer must be identified on system plans and specifications.

DISCUSSION: This is ambiguous regarding person who designed or firm responsible for design.

ACTION ITEM: You can require legible signature and date on documents.

CODE: 4.3.1.4, Qualified persons

DISCUSSION: Further ambiguity and internal conflict. This section says manufacturer training or State license or certificate or local training. Does not say what "qualified" relates to.

ACTION ITEM: You can require manufacturer training, even manufacturer trained technician start-up.

CODE: 4.3.2, Installer qualification - qualified and experienced.

DISCUSSION: This refers to installer or supervisor of installer.

ACTION ITEM:

CODE: 4.4.1.3,4, Two independent power supplies for intrusion or holdup, duress, ambush systems.

DISCUSSION: Non-required secondary power supplies must comply with Standard. No backup period listed.

ACTION ITEM: You can require 24-hr non-alarm operation followed by 15-min alarm without charge (recommended).

CODE: XX.xx.x.x, Marking and Locking of Power Circuit Breaker

DISCUSSION: This is where most NFPA publications require that the circuit breaker feeding the control panel be locked, painted red and labeled, "SECURITY SYSTEM". It is not in NFPA 731.

ACTION ITEM: You can write in your specification to require that the circuit breaker feeding the control panel be locked, painted red and labeled, "SECURITY SYSTEM".

CODE: 4.4.2.7, Transient Voltage Surge Protection must be built-in

DISCUSSION:

ACTION ITEM: Include in the specification.

CODE: 4.4.2.3, Label circuit breaker, "PREMISES SECURITY CIRCUIT."

DISCUSSION: Still, they don't list the lock or red paint.

ACTION ITEM:

CODE: 4.4.3.4,5, Backup Power – 4-hr standby and 15-min alarm.

DISCUSSION: 24-hr is better because Utilities take time to recover power.

ACTION ITEM: Write your spec following your professional judgement.

CODE: 4.4.4.1,2 Batteries – Mark with date of manufacture and date of installation.

DISCUSSION:

ACTION ITEM: Spec to require marking of batteries with date of manufacture and date of installation.



CODE: 4.5.5, Equipment must operate 85 – 100% voltage, 0-120F and 85% RH at 86F.
DISCUSSION: Note that this does not include outside in northern climates (-20F) or southern climates (130F).
ACTION ITEM: Expect to relax spec requirements outside listing. This does not mean they won't work, just that they aren't guaranteed to work. There is a problem with UL listing and temp.

CODE: 4.6.2.3, Control panel or initiating device which requires reset shall have indication of need.
DISCUSSION: Remember, many security alarm manufacturers do not have commercial or industrial experience.
ACTION ITEM: Include in specification.

CODE: 4.6.3.3, Use splice device.
DISCUSSION: Some installers just twist and tape. Really.
ACTION ITEM: Include in specification.

CODE: 4.6.3.5, Use manufacturer's recommended cable.
DISCUSSION: This is something Insurance Inspectors check after a catastrophe.
ACTION ITEM: Include in specification.

CODE: 4.6.3.7, strain relief loop required.
DISCUSSION: Mandating good workmanship.
ACTION ITEM: Include in specification.

CODE: 4.6.3.13,14, Label power circuit inside control panel not visible to the public.
DISCUSSION:
ACTION ITEM: Include in specification.

CODE: 4.6.4, Provide a 6-in service loop within panels, boxes and at field terminations.
DISCUSSION:
ACTION ITEM: Include in specification.

CODE: 4.7, Low-Power Radio (Wireless) Systems
DISCUSSION: The Standard recognizes such systems. I have had consistently bad experience when such were attempted and finally replaced by hard-wired.
ACTION ITEM: Use your professional judgement.

CODE: 4.9, Zoning and Annunciation
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DISCUSSION: Zoning is not described here, but means grouping initiating points in alarm for easy pattern recognition. Annunciation is visual summary notification at the control panel and as transmitted to a monitoring point. This does not remove the requirement for individual addresses.

ACTION ITEM: Study the standard control panel HMI and make sure you are satisfied or write additional requirements into the specification.

CODE: 4.10, Software control.

DISCUSSION: Very weak standard. Requires must be identified at a location acceptable to the AHJ.

ACTION ITEM: Recommended specification section: "Provide a non-volatile archive copy of the software and configuration data at the control panel and in a file at the installer's office. Record any changes and update both archive copies."

CODE: 4.12, Documentation and Training

DISCUSSION: Installer must certify to AHJ that system installed in accordance with the system design and tested in accordance with manufacturer's instructions.

ACTION ITEM: Include in specification.

CODE: 4.12.2.1, Documentation in control panel

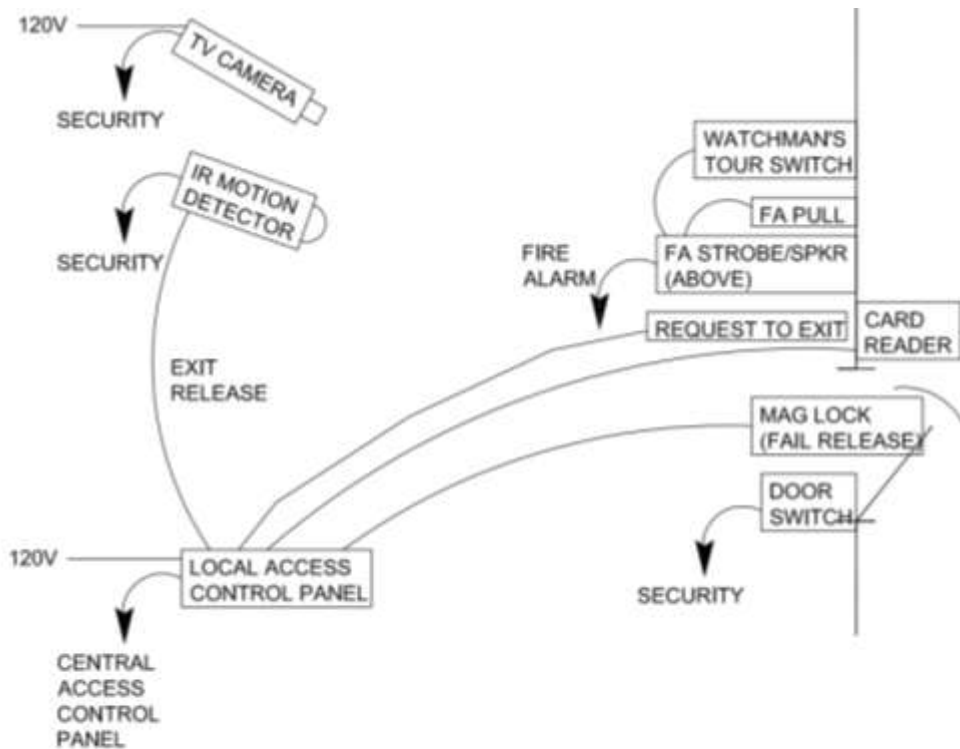
DISCUSSION: Owner's manual; user's instructions; record of completion by installer; name and phone of maintainer; name and phone of monitoring organization; other info as required by AHJ

ACTION ITEM: Include in specification.

CODE: 4.12.3, Training, training materials.

DISCUSSION: Service provider shall provide training and maintain such training for one year.

ACTION ITEM: Include in specification. Suggest provide by installer instead of service provider.



NOTE: ALL SECURITY / ACCESS CONTROL WIRING CONCEALED OR IN CONDUIT / ARMOUR

## **DOOR SECURITY / ACCESS CONTROL DETAIL**

EXTENDED DISCUSSION: This is a detail I prepared for a Cadillac assembly plant. It shows components discussed in NFPA 731 as well as fire alarm devices. The motion detector and RTX releases could be disabled from the central console. The motion detector performed intrusion detection also.

CODE: 5.1.1, Control Units, Subcontrols, and devices shall be within the area being protected.

DISCUSSION: This says that the protection perimeter must be outside the control panel.

ACTION ITEM:

CODE: 5.1.2.1, Wiring shall be monitored for integrity (supervised)

DISCUSSION: A trouble alarm must be issued and archived for any short or open in the wiring, along with return to service.

ACTION ITEM: Include in specification.

CODE: 5.1.4, Entry / Exit Delay – 15-240 seconds

DISCUSSION: An apparent entry violation can be aborted by keypad use within the delay period. If the door position switch indicates more than the delay period, it will register an alarm.

ACTION ITEM: Include in specification.

CODE: 5.1.5.1, Install per manufacturer's instructions.

DISCUSSION: This is a major quality assurance item and basis for re-work following inspection.

ACTION ITEM: Include in specification.

CODE: 5.2, Exterior Space Detection – must not alarm without verification per 9.6.1.1

DISCUSSION: 9.6.1.1 calls for EVC (enhanced call verification – call to two client representatives), RVV (remote video verification), RAV (remote audio verification) or MTV (multiple trip verification).

ACTION ITEM: Think thru your protection philosophy and get Client buy-in. This says to follow-up on an external trip, but don't alarm.

CODE: 5.2.1.2, Two photocell trips required for alarm trip.

DISCUSSION: Again, protection philosophy is not mandated by the Standard. If you and the Client want follow-up on a single photocell, then write the specification that way.

ACTION ITEM:

CODE: 5.2.3.1, Exterior Structure Detectors shall include audio; contacts; fiber optic, protective cabling, proximity, shock sensors and stress sensors.

DISCUSSION: Bad language. You certainly don't have to include all of these or any of these.

ACTION ITEM:

CODE: 5.2.4.2, Exterior Buried Detectors shall include electromagnetic, fiber optic, leaky coaxial and seismic.

DISCUSSION: Bad language. You certainly don't have to include all of these or any of these.

ACTION ITEM:

CODE: 5.2.4.3, Video Motion Detection shall annunciate at the protected premises or the monitoring station or both.

DISCUSSION: Almost all modern security CCTV recorders include adjustable motion detection. That is, you set a window on the screen to trip a contact. This says that you should use it. Beware, passing clouds trip the video motion detector, as do passing headlights.

ACTION ITEM:

CODE: 5.3.3, Interior detection alarm shall be verified prior to a request for service made to an AHJ.

DISCUSSION: I am guessing that NFPA doesn't want the control panel to call the police on a single alarm. Most municipalities forbid direct calling police. The box calls the monitoring station and the human at the monitoring station calls the police.

ACTION ITEM:

CODE: 5.3.3.1.9.2, Motion detectors shall be used only in a suitable environment and for an opening or area that is suitable.

DISCUSSION: This is an oblique reference to the 32-120F limitation. You certainly can install motion

detectors in northern and southern climates. There is a problem with documentation. The area reference says that you shouldn't expect a 900 sq-ft detector to protect a 1500 sq-ft space.

ACTION ITEM: Prepare construction plans carefully.

CODE: 5.4.2.3, Vault detection shall include contacts, embedded cable, foil lining, heat detection, shock, smoke detection sound.

DISCUSSION: Vaults are common in schools and public buildings. With all the attention on HIPPA, they may be appropriate for medical facilities as well.

ACTION ITEM: Prepare construction plans carefully.

CODE: 5.4.4, Automatic Teller Machines (ATMs) are the same as safes, which follow the listing for vaults.

DISCUSSION:

ACTION ITEM:

CODE: 6.1.4.2, keypads shall be mounted on the latch side of a door

DISCUSSION:

ACTION ITEM:

CODE: 6.1.4.5, keypads for vehicles shall be accessible to the driver

DISCUSSION:

ACTION ITEM: Provide both car and truck keypads at driveway intended for both

CODE: 6.1.4.6, keypad shall provide visual or audible indication of successful read

DISCUSSION: Note that this is not approved access, just successful read.

ACTION ITEM: Include in specification.

CODE: 6.1.4.7, Maximum interval between approved access and unlicking is 10-seconds

DISCUSSION:

ACTION ITEM: Include in specification.

CODE: 6.1.5.1, Control of egress shall comply with applicable codes based upon occupancy and use of the facility

DISCUSSION: Great caution required here. The simple interpretation is the same as discussed in the Request-to-Exit item, 3.3.24. However, the exact words here say that if present usage is different than original usage, then egress protocol must match present. If you have an open house, you must re-program the security.

ACTION ITEM: This is the law. Owners and operators don't like re-programming.

CODE: 6.1.5.3, Locking on swinging, sliding and overhead fire doors must comply with their listings.
DISCUSSION: Installing Contractors do some strange things when confronted with a difficult task. They can be counted on to get it done, but not necessarily comply with laws, Codes of listing requirements.
ACTION ITEM: Look for new or crude penetrations to the door and frame on final walk-thru.

CODE: 6.1.5.4, Doors shall automatically secure when the control system is operational
DISCUSSION: I read this to require a door-closer. It may mean that maintenance is required with the closer or spring=latch is damaged. Certainly, it forbids tape to hold the latch open.
ACTION ITEM: Check Door Hardware Schedule on secure doors.

CODE: 6.1.5.6(1), Details on installing manual Request-to-Exit - if required, provide it on egress side; Position on door leaf, gate or physical barrier; must directly release, not thru security system.
DISCUSSION:
ACTION ITEM: Include in design and specification.

CODE: CODE: 6.1.5.6(1), Details on installing automatic Request-to-Exit or not-a-door - if required, provide it on egress side; label, "PUSH TO EXIT"; must directly release, not thru security system
DISCUSSION:
ACTION ITEM: Include in design and specification.

CODE: 6.1.6.2, Door position switch must trip at 6-in or more sensitive.
DISCUSSION:
ACTION ITEM: Include in specification.

CODE: 6.1.6.3, Door position switch must be monitored by head-end controller.
DISCUSSION: This identifies the supervisory nature of the central controller, where event archiving takes place. Door opening must be logged whether authorized or non-authorized.
ACTION ITEM: Include in specification.

CODE: 6.1.7.1.2, When the RTX controls the lock the lock must release on loss of power.
DISCUSSION: Be very careful here. The exact wording specifies the lock. It does not define controller logic.
ACTION ITEM: Include in specification and check the submittal. Called, "FAIL UNLOCKED."

CODE: 6.1.7.2, Controlled egress requires a keypad on the secure side of the door
DISCUSSION:
ACTION ITEM: Include in design as required. That is, you decide if it is controlled for free egress.

CODE: 6.1.8.3, Local controller must be located in a space that protects it from damage, tampering or
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access by unauthorized personnel.

DISCUSSION: Usually location is selected by installing Contractor.

ACTION ITEM: Verify acceptable location on final walk-thru.

CODE: 6.2.2, System programming shall be protected from unauthorized changes.

DISCUSSION:

ACTION ITEM: Include in design and specification, as, "Password protected>"

CODE: 6.2.3, Operation of the access control system shall be in compliance with fire and building codes.

DISCUSSION: Note that all codes include the provision for written exemption by the AHJ.

ACTION ITEM: Include in design and spec. Try to make the installer responsible for compliance.

CODE: 7.1.1, Application and use video systems shall be based on the requirements of the AHJ.

DISCUSSION: This requires contorted thinking. Since NFPA-731 is not legally mandated, then the AHJ is not the municipal Building Standards office or Electrical Inspector. The standard is being imposed by the Specifier, so YOU decide what to install, where to install it and how to connect it.

ACTION ITEM: In your specification, say, "In strict accordance with NFPA-731."

CODE: 7.1.5.1, Control units and devices shall be located within a secured area.

DISCUSSION: Place the controls within the secured area. However, it is extremely valuable to place a camera "across the street" to record persons entering the area and what they are carrying out.

ACTION ITEM: Design all of the controls and most of the devices within the secured area. Place cameras where they record the most valuable information.

CODE: 7.1.6, Systems shall comply with federal state and local privacy laws.

DISCUSSION: Audio recording is forbidden unless you post a sign. Video recording is generally permitted, except in restrooms, changing rooms, and such.

ACTION ITEM: Use judgment in placement of cameras.

CODE: 7.2.1, Cameras shall be listed or labeled in compliance with applicable standards.

DISCUSSION: There are super inexpensive Chinese cameras available. They work very well and have a wide range of features. They lack US approval labels.

ACTION ITEM: Slightly more expensive versions are available through US distributors, carrying US approval labels, see <http://www.gw-security-camera-system.com/>

CODE: 7.2.2, Cameras shall be installed in accordance with the manufacturer's instructions.

DISCUSSION: Often an outdoor-rated camera works as well or better than an indoor rated camera inside the building.

ACTION ITEM: Get a copy of the installation manual before finishing the design.

CODE: 7.2.3, Level of vandal resistance shall be determined by the AHJ.
DISCUSSION: Some installing Contractors go cheap on the installation. You want concealed, inaccessible wiring. This is not hard, but it takes a little more time.
ACTION ITEM: Detail anti-vandalism installation methods in the design. Mount cameras above reach.

CODE: 7.2.5, Protect outdoor cameras from icing, sunlight angles, temperature extremes, wind loading, rain.
DISCUSSION: Discount this section heavily. A fixed, sealed camera will survive almost anything. A pan-tilt-zoom camera with vent and heater will get lots of maintenance and early replacement.
ACTION ITEM: Use fixed, sealed cameras. When wide field of view is required, use two or more. See <a href="http://www.arecontvision.com/">http://www.arecontvision.com/</a>

CODE: 7.2.6.1,2, Avoid strong backlighting or specify wide dynamic range and backlighting compensation.
DISCUSSION: Backlight compensation for video is like automatic volume control for audio. It raises the sensitivity in dark areas and reduces it in bright areas, giving consistent visibility across the scene.
ACTION ITEM: Avoid pointing a camera at a light source, as, a light fixture of outside window.

CODE: 7.5, Hardware and mounts shall be in compliance with ANSI / UL 2044, or such.
DISCUSSION: I have been very happy with a bent piece of aluminum bar stock as the mounting bracket. Don't get excited about pretty plastic and swivels. The ANSI / UL listing costs the vendor a lot.
ACTION ITEM: Specify substantial mounting hardware.

CODE: 7.5.4, Tamper resistance requirements shall be determined by the AHJ.
DISCUSSION: I have inspected a great many failed cctv cameras. It is not the use of hex bolts. It is the massive trauma applied.
ACTION ITEM: Mount cameras well above reach.

CODE: 7.6, 7.1.3, Lenses shall provide visual identification of a person, object, or scene (See Annex B.)
DISCUSSION: This topic deserves extended discussion. A quick-fix is a very high resolution camera which displays the scene (wide angle) and permits identification of facial features (long distance). Modern 1920x1080 (1080p) cameras do this. The newer 3840x2160 (4x) cameras do this very well, at the expense of greater disc storage requirements (4x).
ACTION ITEM: Specify high resolution cameras; use 1920x1080 notation.

CODE: 7.7.4.2, Twist-on connectors shall not be used.
DISCUSSION: Twist-on connectors are used for co-ax, the obsolete analog video transmission method. It is recommended that not only twist-on connectors, but also obsolete analog video transmission not be used.
ACTION ITEM: Specify digital POE cameras that operate from a single LAN data cable (10 cents a foot).



CODE: 8.1.1.1 Holdup alarm initiating devices shall be in accordance with ANSI / UL 636.
DISCUSSION: Getting listed costs the manufacturer a lot. On the other hand, many low-cost holdup alarm initiation devices have been very flimsy in construction, wiring and connections. Listing doesn't guarantee substantial construction, but is an indicator.
ACTION ITEM: Specify substantial construction of holdup alarm initiating devices.

CODE: 8.1.2.1, Low-powered radio connection...
DISCUSSION: This course recommends against use of low-powered radio connections. Experience has been uniformly bad.
ACTION ITEM: Avoid low-powered radio connection for holdup alarm initiating devices.

CODE: 8.2.2.5, Operation of a holdup alarm initiating device shall not result in an audible signal at the protected premises or a visual signal observable by the attacking party.
DISCUSSION: Don't get the clerk shot.
ACTION ITEM: Avoid local notification of a holdup alarm.

CODE: 8.3.1, Portable duress alarm initiating devices shall be in compliance with ANSI / SIA CP-01
DISCUSSION: Portable duress alarm initiating devices (man-down switch) save lives. The best are part of two-way radios. There are good ones that use low-power radio and dedicated receiver locations.
ACTION ITEM: Specify the make and model of the unit you want.

CODE: 8.4.2.1, Ambush alarm systems using a duress code at the disarm keypad.
DISCUSSION: This is a standard feature of almost all commercial security systems. It is good.
ACTION ITEM: Specify incorporation of a duress code for the disarm keypad.

CODE: 9, Monitoring stations
DISCUSSION: Monitoring stations are not included in this course.
ACTION ITEM: Specify non-volatile archiving time / date of all system events and central monitoring if possible.

CODE: 10, Testing and inspections
DISCUSSION: Testing and inspections are not included in this course.
ACTION ITEM: Specify an acceptance test to be performed by a factory-trained technician with written results and legible date and signature delivered to the Owner's Representative. Require prior notification for witness by Owner's Representative. Require use of the form in A.4.12.2.1(3)

CODE: 11, Asset Protection Systems
DISCUSSION: Asset Protection Systems are not included in this course.
ACTION ITEM:

CODE: Annex B,C, Camera Specifications

DISCUSSION: Real-world selection of camera and lens is very easy, due to modern technology. Standard, commodity cctv cameras respond to light levels beyond the sensitivity of the human eye. Add infra-red LED illuminators beyond. A 1.2mm wide-angle lens on a 1920x1080 or 3840x2160 camera meets almost all requirements. A 1.2 – 12mm vari-focal lens is adjustable to provide short telescopic (facial recognition at 100-ft). Long telescopic (75mm) lenses can provide license plate recognition at 500-ft

ACTION ITEM: Specify the 40-ft field of view and let the contractor select the lens. (A 1920x1080 camera can resolve facial features over a 40-ft field. Lenses put that field near to or far from the camera.)

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