Chapter 9: Museum Collections Security and Fire Protection

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CHAPTER 9: MUSEUM COLLECTIONS SECURITY AND FIRE PROTECTION

A. Overview

As hard as we try, nothing lasts forever. Still, an effective preservation program can delay the inevitable. Preventive conservation can slow the rate of loss to natural, expected causes, while a comprehensive security system can help limit losses from unexpected causes, such as fire, theft, natural disasters, and accidental damage. Security and fire protection are as important to the long-term survival of a collection as proper curation, storage, and conservation and must be an integral part of the day-to-day care of the collection.

1. *What is a comprehensive security system?*

A comprehensive security system combines policies, procedures, personnel, and hardware to protect museum collections from unexpected losses caused by crime, negligence, fire, or other catastrophic events. Four concepts are implicit in such a system:

- The park itself is a system, and security is one of its subsystems.
- Identifying objectives precisely and clearly is the most important step you can take in designing an effective system. A security system for museum collections, for example, has two principal objectives: to protect museum collections and associated records from catastrophic loss, and to protect the documentation related to objects in the collection, such as accession records, catalog records, conservation reports, and photographs.
- No single subsystem or component can achieve a security system's overall objectives. Subsystems must complement each other to make the system efficient and ultimately successful.
- Subsystems and components are interdependent within a system. Changes in one part affect the whole system and may have unexpected consequences. For example, placing an air handler in a museum collection storage area might be an efficient use of space, but it complicates access control, adds a potential source of ignition, and increases the risk of accidental damage to museum objects.

2. *How should I design an effective security system?*

There are no cookbook solutions for security problems, and no single recipe will turn out a perfect security system every time. Each park must develop its own system. Every park is unique, faces different threats, has different short-term objectives, and has different resources available. While security concepts are mostly common sense, applying them effectively requires care, consideration, and experience.

One way you might think about a comprehensive security system is to visualize a series of concentric circles that form a bull's-eye (see Figure 9.1). Simply stated, you should add more and tighter security precautions as you get physically closer to a high value object, like the rings on the

bull's-eye diagram. The more valuable the protected object, the more protection rings there should be, and the more they should focus on the object. The figure also shows the overlapping and complementary roles played by park boundaries, policies, procedures, the building shell, cases, electronic systems, and personnel.

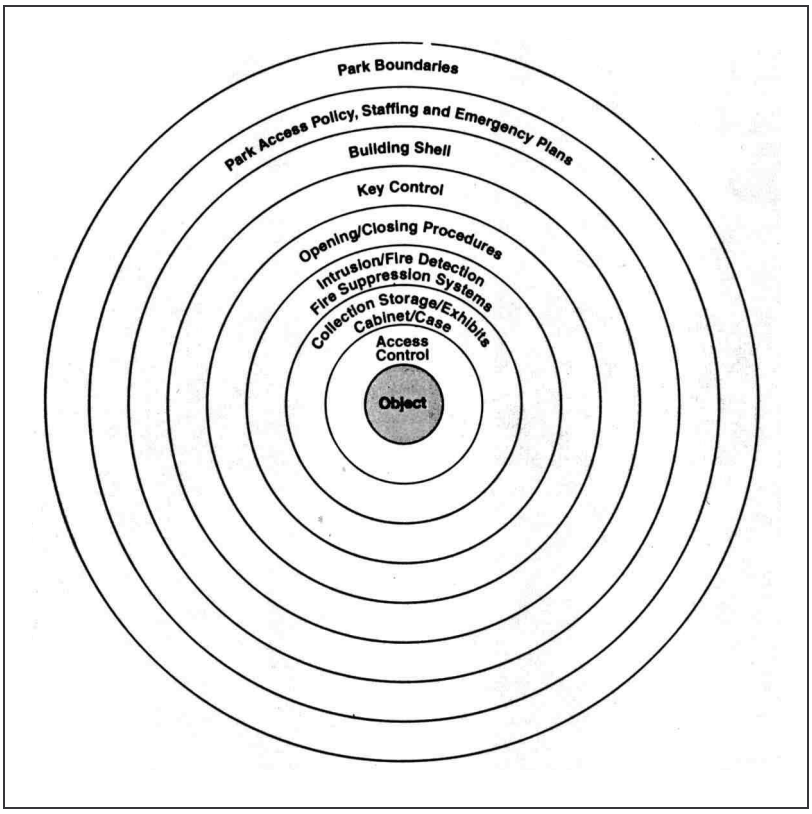

Figure 9.1. Security Bull's-Eye

3. Who is responsible for security?

Overall responsibility for protecting the park's museum collection rests with the superintendent, while museum and law enforcement staff share direct day-to-day responsibility. Nevertheless, you and all of your fellow park employees—permanent, seasonal, salaried, or volunteer—are part of the park's security system and have security responsibilities that should be reflected in the park's standard operating procedures (SOPs).

4. *What information will I find in this chapter?*

Information in this chapter will help you:

- identify threats to your collections
- assess the risk of loss
- select and implement appropriate countermeasures
- measure the effectiveness of those countermeasures

See NPS Museum Handbook, Part I, Appendix G: Protection of National Park Service Museum Collections, for NPS security and fire protection standards, glossary of terms, and sample statements of work, standard operating procedures, and agreements.

B. Legal, Regulatory and Policy Requirements

Protection of museum collections is basic to the mission of the National Park Service. The following digest of statutes and policies provides a starting point for a park's protection program. In essence, they require you to use the most effective means available to protect museum collections against fire, theft, and other threats without compromising their integrity.

1. *What laws and regulations do I need to know?*

Title 40 United States Code (USC), *Public Buildings, Property, and Works* Paragraph 486(c) provides statutory authority for the head of each executive agency to issue orders and directives necessary to manage the Government's property.

Code of Federal Regulations (CFR) 41 *Federal Property Management Regulations* Part 101, Subpart 20.5 "Physical Protection", prescribes policies and methods for physically protecting buildings and grounds operated by GSA and other Federal Executive agencies. The Department of the Interior's property management regulations are in Part 114 of CFR 41.

2. *Which parts of the Department of the Interior's Manual address protecting museum collections?*

Part 411, Chapters 1-3, sets standards and requirements for protecting museum property.

Part 444, Chapter 1, tells you how to safeguard personnel, prevent unauthorized access to Federal property and records, and safeguard against espionage, sabotage, vandalism, and theft.

3. *What sections of NPS Management Policies refer to protecting museum collections?*

Section 5.3, Stewardship concerns the protection and preservation of cultural resources. It states the National Park Service will employ the most effective concepts, techniques and equipment to protect cultural resources against theft, fire, vandalism, overuse, deterioration, environmental impacts, and other threats, without compromising the integrity of the resources. It also states that:

- Measures to protect or rescue cultural resources in the event of an emergency, disaster, or fire will be developed as part of a park's emergency operations and fire management planning processes. Designated personnel will be trained to respond to all emergencies in a manner that maximizes visitor and employee safety and the protection of resources and property.

- In the preservation of historic structures and museum and library collections, every attempt will be made to comply with national building and fire codes. When these cannot be met without significantly impairing a structure's integrity and character, the management and use of the structure will be modified to minimize potential hazards, rather than modifying the structure itself.

- When warranted by the significance of a historic structure or a museum or library collection, adequate fire detection, warning, and suppression systems will be installed. "Pre-fire plans" will be developed for historic structures and buildings housing museum or library collections, designed to identify the floor plan, utilities, hazards, and areas and objects requiring special protection. This information will be kept current and made available to local and park fire personnel.

- Park and local fire personnel will be advised of the locations and characteristics of cultural resources threatened by fire, and of any priorities for protecting them during any planned or unplanned fire incident. At parks with cultural resources, park fire personnel will receive cultural resource protection training. At parks that have wildland or structural fire programs, cultural resource management specialists will receive fire prevention and suppression training and, where appropriate, will be certified for incident management positions commensurate with their individual qualifications.

- Smoking will not be permitted in spaces housing museum or library collections, or in historic structures (except those used as residences in which smoking is permitted by the park superintendent).

4. *Which Director's Orders address protecting museum collections?*

Several Director's Orders contain instructions related to protecting museum collections.

Director's Order #9: Law Enforcement Program, vests considerable authority and responsibility in law enforcement staff for protecting park resources, including museum collections. It tells you to inventory your resources and prioritize protection needs after you assess their significance and vulnerability. It also discusses crime prevention and physical security programs in parks.

Director's Order #28: Cultural Resource Management and Cultural Resource Management Guideline, Release No. 5 (1997), which implements Director's Order #28, addresses protecting and managing all cultural resources, including museum objects.

- *Chapter 4* provides overall guidance on protecting cultural resources. The sections on physical security and structural fire relate to protecting museum objects.

- *Chapter 9* says a systematic approach to protecting museum objects involves:

  – identifying and evaluating threats and risks

  – conducting and reconciling annual inventories of collections

  – developing and implementing good operational procedures and practices, such as key control, access control, and opening and closing procedures

- evaluating the physical security of spaces housing collections, with attention to barriers, cases, locks, doors, and windows
- installing intrusion detection systems and fire detection and suppression systems that are appropriate to the nature of collections and the structures housing them
- incorporating the special needs of collections in physical security plans, structural fire plans, and emergency operations plans
- ensuring that all incidents involving collections are reported

Director's Order #44: Personal Property Management and Personal Property Management Handbook #44, Section 9.3 governs firearms and ammunition that are part of a museum collection.

Director's Order #50B and Reference Manual #50B, Occupational Safety and Health Program state the installation, inspection, and maintenance of fire sprinkler systems, fire alarm systems, life safety systems, smoke detectors, fire extinguishers, and other fire protection features will be in accordance with National Fire Protection Association (NFPA) requirements.

Director's Order #58 and Reference Manual #58, Structural Fire Management tell you how to manage a structural fire program. Structural fire management is defined as the protection of people, content, structures, resources, and the landscape surrounding the structure from the effects of fire.

C. Measuring the Effectiveness of a Security System

Past experience is an important element. Complete and accurate loss records, such as Case Incident Reports, are vital. Nevertheless, past history does not tell the whole story. You also must:

- analyze the risk comprehensively
- evaluate the effectiveness of the countermeasures intended to reduce the risk
- determine how well the security system fits the operational needs of your park

All the elements are important. And remember, a system that reduces risk but paralyzes operations is not effective.

1. *What are the threats to museum collections?*

Figure 9.2 lists the threats to museum collections.

General Category	Specific Threat
Crime	Burglary, Larceny, Robbery, Bombing, Vandalism, Arson
Civil Disturbances and Warfare	
Natural Catastrophes	Earthquake, Flood, Landslide, Fire, Hurricane, Tornado, Tidal wave, Lightning, Volcanic eruption, Wildlife
Industrial Disasters	Explosion Structural collapse Hazardous materials release Fire Serious employee or visitor accident Nuclear incident Power outage Loss of water, sewer, or gas service
Other Threats	Accidental damage Acts by disturbed persons Transportation accidents

Figure 9.2. Threats to Museum Collections

2. *What is risk assessment?*

In assessing risk, you must analyze a threat's probability of occurrence and the severity of its consequences. You'll need to identify the possible ways losses can occur, what the impact of the losses would be, and how you prevent or reduce the losses.

Probability

While the number of potential threats is unlimited, some are more likely than others. In general, the more ways something can happen, the higher the probability it will happen. For example, consider a park with an extensive collection of Native American artifacts--pots, baskets, and other easily sold items. If the threat is theft, any of the following conditions, or some combination, increase the probability of a loss:

- Pots and archeological fragments on exhibit are not in locked exhibit cases.
- Objects on display are not routinely inventoried.
- There are no procedures for temporarily removing objects from exhibit cases.
- Exhibit cases have plain glass and standard fasteners.
- Exhibit spaces have large windows close to the ground.
- Door locks are not strong enough to prevent forcible entry.

- The building is not protected by an intrusion detection system.

Some threats are unlikely in some parks. For example, a park in New Mexico doesn't need to plan for a tidal wave. Some threats just seem unlikely. For example, a 500-year flood may seem to be a remote threat. But if we remember that the objective of the NPS preservation program is to preserve museum objects and historically significant structures for as long as possible, a 500-year flood is a threat that deserves thoughtful planning.

Severity

Highly probable threats may not require much in the way of preventive measures if the net loss or damage they would cause is small. On the other hand, moderately probable or greater threats demand greater attention if the impact would be great. For example, it is highly probable that someone will take the ball point pen from a visitor registration desk, but it is more cost-effective to use cheap pens, and replace them, than to prevent the loss. On the other hand, a low to moderate probability of arson in an historic structure demands full protective measures because the impact could be significant.

You can measure the impact of a loss by the direct cost, or dollar value, of the lost or damaged property and the cost of its repair or replacement. Direct cost is quantifiable and can be used to evaluate the cost-effectiveness of potential countermeasures. However, it may not be the most important measure, because the indirect costs may have a more severe impact on the park's mission. Indirect costs could include:

- effects on employee morale and reputations
- effects on public relations
- loss of donations to parks that do not protect their assets
- adverse impacts on the park's interpretive program

For example, a soldier's diary may have little dollar value, but it can play a significant part in telling the story of how the soldier lived and how soldiers in general took part in the development of the country. The diary serves both as an information resource and as a tangible point of reference to help visitors relate to the story. The fact that the diary is an original object enhances the relationship. If the diary is stolen, the interpretive story suffers in ways that cannot be translated into dollars.

3. *How do I conduct a risk assessment?*

First, you need to identify the potential threats or hazards that have the greatest probability of occurring and those with the greatest adverse impact on the museum collection.

Then look for irreplaceable, valuable and particularly sensitive objects, especially those on exhibit, such as historic firearms and paintings.

Finally, analyze the nature and effectiveness of the protection currently given such objects. For example, if you want to assess how well an object is protected from theft, try to think like a thief.

- A thief has to touch an object with something--hand, stick, wire hook, an accomplice--to steal it. Look at obvious ways first. In one theft from a park, the thief removed a diary from a case by tilting up the unsecured vitrine cover.

- If the case is small or poorly mounted, the thief might take both the case and the object in it. Look carefully at how cases are mounted. The case may be strong, but the wall mounting may be weak so the thief can pull the case off the wall, or remove it by taking out a few fasteners. So ask yourself:

  – Are doors and cases locked?

  – Are cases structurally sound?

  – Are fasteners firmly in place?

- After checking the obvious, be creative. A thief is not restricted by our concept of what someone might do, only by what it is possible to do. In one incident, a thief boosted a small child over a Plexiglas™ barrier that covered all but a small space at the top of a door into a period room. The child gathered objects and escaped through another door.

4. *How can I limit the risk?*

If possible, eliminate threats; if not, reduce them by:

- ***Risk Assumption*** is the process of using existing resources to absorb losses as and when they occur. It may be appropriate under the following conditions:

  The impact of a loss is small. For example, it is advisable to assume the risk of some forms of vandalism.

  The likelihood of damage is small. For example, it takes considerable effort to damage a stone-grinding wheel. Even if the grinding wheel is original to the site it may not make sense to exhibit it in a case, or even in a building, when it is easier to see outside and the wheel's size and composition make it nearly indestructible.

- ***Risk Transfer*** is the process of transferring a risk to another entity for a fee. It is usually not appropriate because the NPS generally insures property only when it is borrowed from someone outside the government or another government agency.

See the Museum Handbook, Part II, (MH-II) Museum Records, Chapter 4, Inventory and Other Special Instructions for guidance on insuring borrowed objects.

5. *How often should I assess risk and what tools are available?*

Director's Order #24: NPS Museum Collections Management requires parks and centers to keep the NPS Checklist for Preservation and Protection of Museum Collections (Checklist) up-to-date in the Automated Checklist Program (ACP) in ANCS+. The Checklist records information on preservation and protection conditions (including fire and security protection) in parks and centers, identifies deficiencies, and provides estimated costs to correct deficiencies. You can use the checklist to conduct a self-assessment of your park's level of museum security and fire protection. See Appendix F: NPS Museum Collections Management Checklists, and the *Automated National Catalog User Manual*, Appendix G: Automated Checklist Program, for guidance on the checklist.

6. *How do I conduct a self-assessment?*

Conduct a ***Basic Security Inspection*** by using the checklist as a guide to inspect museum collection spaces. There are three steps in this inspection.

- Describe the nature of the museum collection, to include:
  - types of materials used, such as paper, wood, or stone
  - value of objects (for example, monetary, research, interpretation)
  - most significant objects in the collection (for example, letter signed by President Truman)

> ***See the NPS Museum Handbook, Part II, (MH-II) Chapter 4: Inventory and Other Special Instructions, Section IX, Determining the Monetary Value of Museum Objects, for guidance in establishing value.***

- Identify the areas where the collection is kept (such as visitor center exhibit, storage), especially the most valuable and most vulnerable objects.
- Inspect for deficiencies using the NPS Checklist for Preservation and Protection of Museum Collections.

7. *What is a security survey?*

Use a ***security survey*** in the on-site phase of preparing a Collection Management Plan or as a specific need in a self-assessment inspection. Do not forget to include fire protection.

A comprehensive security survey will cover:

- perimeter security
- structures housing the collection
- policies and procedures
- emergency plans

- individual object protection
- fire prevention
- personnel training programs
- structural and procedural fire hazards
- maintenance of protective systems

Either you or a contractor can conduct the survey. Whoever does so must have the following qualifications:

- experience and expertise in protecting museums and historic sites
- sensitivity to the special protection requirements in museum operations
- practical experience in applying the requirements in parks and historic sites

8. *How should I prepare for a survey?*

Write a detailed scope of work (SOW) that serves as a blueprint for the survey and as a standard against which to measure the surveyor's work. See *MH-I*, Appendix G: Protection of National Park Service Museum Collections, for a sample SOW. The scope of work should specify what the surveyor is expected to do, and when, and how to report results.

Make sure all facilities with museum collections will be available during the survey. Brief park staff on the importance of the survey and ask everyone to answer questions candidly.

Prepare the following documents for the surveyor:

- most recently-completed NPS Checklist for Preservation and Protection of Museum Collections
- reports from any earlier security surveys
- plans and drawings of all facilities that house museum collections on which the surveyor will record observations to be included with the final report
- information on installation, operation and maintenance of the existing intrusion, fire detection, and fire suppression systems

Schedule meetings with the superintendent and key security, fire protection, and museum staff at the beginning of the survey to discuss its scope and at the end to discuss findings and recommendations. Also, schedule blocks of time for key staff members to spend with the surveyor during the site visit.

9. *What should the survey report include?*

From the site visit, the surveyor will:

- identify potential threats

- perform a risk analysis
- determine which losses are most likely and which would have the greatest impact
- establish priorities for correcting deficiencies

The final report should include:

- recommended improvements
- countermeasures that correct more than one problem
- alternatives for correcting deficiencies
- estimated cost for each recommended action

10. *What is the final and most important step?*

The last and most important part of your security survey will be the corrective action plan you will develop and implement afterwards. Take corrective actions that do not require funds, such as changing operating policies or procedures, immediately. Changes that can be made at a small cost also should be made relatively soon, while changes that require significant funding must be programmed. See *MH-I*, Chapter 12: Curatorial Programming, Funding, and Staffing, for guidance on programming. Naturally, if money is available, the most serious deficiencies should be corrected first. If funding is a problem, many corrective actions can be implemented in stages, or you may want to use the funds that are available to correct several less severe risks. The combined improvement from correcting several small problems can often outweigh the effect of correcting one large one.

If you discovered weaknesses in your security system, your corrective action plan should have taken care of them. If on the other hand, your security system works, stick with it, make minor improvements on the margin, and continue to self-assess on a regular basis.

But what if you need a new security system, in whole or part? The sections that follow in this chapter will help you design effective fire protection and security systems.

D. Fire Protection

Fire can destroy a park's museum collection in a matter of minutes. While a stolen or damaged object might be recovered and stabilized, burned objects, and sometimes even those just exposed to smoke and heat, may be lost forever. Human error, arson, deteriorating electrical and mechanical systems, and congested storage areas are only a few of the conditions that can increase the threat of fire.

Museum management staff should take a hard look at the park's Structural Fire Plan to make sure it addresses the needs of the museum collections.

1. *Who is responsible for fire protection?*

Preventing fire is a fundamental responsibility for every member of the Park Service, and each employee is responsible for:

- maintaining well-organized storage and work spaces
- storing all flammable materials in approved containers outside spaces housing museum collections
- keeping fire exit routes open and clear
- enforcing a no-smoking policy in museum spaces
- controlling ignition sources, such as fires in the fireplace of a historic structure
- practicing good housekeeping
- checking electrical and mechanical equipment for defective components, improper installation, and overloaded circuits
- correcting or reporting fire hazards

Managers have the following additional responsibilities:

- Training all employees in the elements of fire safety, fire prevention, and emergency response with emphasis on:
  - duties in the event of fire or other emergency
  - how to notify the fire department and other emergency response personnel
  - procedures for evacuating visitors and employees
  - special considerations for protecting museum collections
  - location and use of fire extinguishers, fire detection equipment, and fire suppression systems, including the location of sprinkler control valves and how they operate

- Consulting with the local fire department and acquainting fire-fighting personnel with the museum collection and its special needs.

- Being aware of the major causes of fires in parks and museums, as listed below in Figure 9:3.

Major Cause	Average Fires/Year
Electrical Distribution System	22
Incendiary or Suspicious Causes	17
Other Equipment	10
Open Flame	8
Heating Equipment	7
Smoking Material (e.g., cigarette)	7
Cooking Equipment	6
Exposure (to other hostile fire)	4
Natural Causes (lightning, etc.)	4
Appliance, Tool, or Air Conditioning	3
Other Heat Source	1
Child Playing	<1
Total	89

Figure 9.3. Major Causes of Museum Fires[1]

2. *What are the precautions for construction and renovation?*

The National Fire Protection Association (NFPA) Technical Committee on Protection of Cultural Resources says: "Experience shows that the hazard of fire is increased when a museum is being renovated...."[2]

These are only a few of the fire hazards associated with construction and renovation:

- spontaneous ignition of rags used for painting, cleaning and polishing
- careless smoking
- torches and other open flames
- escaping flammable gas
- improper storage and use of flammable and combustible liquids
- poor housekeeping

You must be vigilant during periods of construction and renovation to maintain high standards of housekeeping and to control potential ignition sources.

3. *What about open flames in structures?*

You need to recognize the increased number of fire emergencies due to open flames, such as campfires, candles, lanterns, fireplaces, and stoves that are popular elements in living history programs. You should ensure that the park has written procedures that include:

- Open flames will never be left unattended.
- At the end of the day an appropriate screen will be placed across the opening of any fireplace where there has been a fire that day.
- An appropriate fire extinguisher will be within easy reach when open flames are used inside a building.
- Staff will be trained to use open flame devices properly.
- Fires are not permitted in fireplaces or stoves with unlined chimneys.
- Active chimneys will be inspected and swept annually.

4. *What's the threat from fires?*

When a fire starts, the temperature in the room of origin can be lethal in two to three minutes, and everything combustible in the room can ignite in as little as four to five minutes. If the fire continues to build for another ten to fifteen minutes, chances are the structure will suffer significant damage.

Even a quickly extinguished fire will damage fragile objects. By the time the fire department starts manual suppression, museum objects close to the room of the fire's origin will be damaged or destroyed unless there is an automatic suppression system. When fire fighters start manual suppression, they will pump water on the fire through two or more hoses, each delivering 125–250 gallons per minute. But even a well-trained fire department located close to a burning structure requires more than 10 minutes to:

- receive the alarm
- travel to the site
- set-up equipment
- search for occupants
- find the origin of the fire
- begin manual suppression

5. *What should a structural fire plan cover?*

You need to ensure that your park's Structural Fire Plan includes protecting museum collections. The overall plan should address preventing, detecting, and suppressing fire throughout the park. The section of the plan that deals specifically with museum collections should also include the following:

- a memorandum of agreement with the local fire department calling for mutual cooperation in preparing a pre-fire plan for each structure

  Curatorial staff should be involved in planning and have input into developing fire department response and salvage plans. See *MH-I*, Appendix G: Protection of National Park Service Museum Collections, for a sample memorandum of agreement.

- operating and maintaining any automatic suppression systems
- a list of personnel designated to respond to a fire involving museum objects and their specific responsibilities
- training all park staff in procedures to follow in the event of a fire to minimize damage to museum collections
- a plan to relocate important objects in the collection to a pre-designated secure location

6. *How do I limit fire risk?*

By preventing, detecting, and suppressing fire.

7. *What constitutes a good fire prevention program?*

Do these three things:

- **Prevent ignition:** The employee responsibilities listed above accomplish this. Unfortunately, people still make mistakes, and some things are always beyond our control. Between the two, fires will happen.
- **Prevent fire spread**: When a fire starts, prevent its spread by
  - limiting the amount of fuel available
  - confining the fire in a space with a limited amount of oxygen
  - activating an automatic fire suppression system

  Barriers can limit the spread of fire, smoke, and other combustion products.

  An enclosed stairway is an excellent example of a structural feature that serves both as a fire and a smoke barrier. Open stairways act as chimneys in a fire, drawing flame, smoke, and products of combustion from one floor to another. Well fitting doors on each floor can prevent the spread of fire and smoke, but all it takes to compromise the protection is a single chocked open door.

  And more than one closed bedroom door has protected a sleeping person from the effects of smoke and carbon monoxide.

Prevent fire from reaching vulnerable objects: If you've used properly designed storage containers, you can protect vulnerable objects or records from fire for a time. For example, a locking, insulated safe, filing cabinet, or vault designed to maintain an interior temperature of less than 350°F during a one-hour exposure to exterior temperatures of at least 1700°F can protect paper accession records. Similarly, a media box that will maintain an interior temperature of not more than 125°F during a one hour exposure to an exterior temperature of 1700°F can protect floppy disks or magnetic tapes, such as those used to back up the Automated National Catalog System (ANCS) data files.

8. *Is a fire detection system essential?*

Even with the best fire prevention program, you will still need a good fire detection system. Human error, natural conditions, and deterioration of buildings and systems almost guarantee a fire at some point, and life safety concerns alone demand rapid detection in an occupied structure.

Consider the following factors to determine fire detection needs:

- significance or value of the collection
- construction of the building
- nature of the collections
- number of occupants and what they are doing
- time needed to evacuate
- likely speed of fire spread
- time it will take to start suppressing a fire
- types of fire detectors available

9. *Who should monitor a detection system?*

A fire detection system only provides information. Someone who can use the information to send help must monitor it constantly. If the park does not have the staff or equipment to do this, the system should be monitored by the local fire department (if they provide this service, and someone is always there) or by a commercial central station that is listed by Underwriter's Laboratory (UL).

Sometimes parks in remote areas do not have access to a UL-Listed central station. In these instances, an unlisted facility may be adequate. You should make sure that the unlisted facility has enough staff to monitor alarms constantly, uses reliable equipment, and provides training to its staff.

10. *Why should I contact the local fire service provider?*

There are several advantages to contacting the local fire service provider. These contacts should be initiated during normal business hours so that they will not have to occur under the pressure of emergency operations. The advantages include:

- learning the availability of expertise for fire prevention inspections and code enforcement
- providing company inspections (orienting and familiarizing each shift)
- identifying the key person and contacts
- training/drills (joint activities to include day/night operations; business

open/business shut down; seasonal - summer/winter)

- pre-fire planning (focusing on floor plans, access, utility shut-off locations, and sensitive items/areas)

11. *What types of fire detectors are available?*

The types of fire detectors normally used to protect museum collections and historic structures are listed in Figure 9.4.

TYPE	BEST USE OF THE DEVICE	WHERE SHOULD IT BE LOCATED?	THINGS TO AVOID
Photoelectric Smoke Detector (Spot Type)	To detect slow, smoldering fires that generate large amounts of visible smoke	• On the ceiling or wall at least 6" from the junction of the ceiling and wall • In the path of air circulation where smoke will reach the detector	• Locating detector directly in the path of air from an air supply or return grill • Hot (>100°F) or very cold (<32°F) spaces • Dead air spaces • Spaces where steam or smoke are expected-- boiler rooms • Within 8' of an active fireplace • Dusty areas • Outside **NOTE**: New detectors have protective screens to keep out insects. Very small spiders can still get into these detectors and cause false alarms.
Photoelectric Beam Smoke Detector (Line Type)	• Large open spaces (30'x30' or greater) with high ceilings (>12') • Slow, smoldering fires	• Large gallery spaces • Auditoriums	• Mounting detectors low (generally below 8') if the beam is broken or partially blocked the detector goes into alarm • Same conditions as spot type photoelectric detector
Ionization Detector (Spot Type)	To detect fast, flaming fires that may not generate much visible smoke	Same as spot type photoelectric smoke detector	Same as photoelectric **NOTE**: Insects are not a problem with ionization detectors, but they are much more sensitive to steam or the fine products of combustion normally found in boiler rooms.
Air Sampling Smoke Detector	Areas where very early detection is vital--these detectors are intended to react before fire reaches the flaming stage	High value areas such as vaults, or sensitive areas such as computer facilities	Where candles, fireplaces, wood stoves, or any other open flame will be used regularly
Flame Detector	Same as air sampling detector--frequently used in explosion-detection systems	Where large concentrations of flammable or combustible gas or dust are found	Same as air sampling smoke detector
Heat Detector	Spaces where environmental conditions cause unwanted alarms from smoke detectors, or where conditions (heat, cold, humidity) will damage electronic devices.	Same as spot type photoelectric or ionization detector	Where life-safety is the major concern--sleeping quarters, etc.-- Heat detectors are not approved for life-safety applications.

Figure 9.4. Types of Fire Detectors

12. *What about maintenance and testing?*

A fire detection system needs routine maintenance and testing to keep it operating as designed and expected.

- Dirty smoke detectors are the most frequent cause of unwanted alarms.
- The control panel can fail, or operate erratically, particularly in areas prone to lightning or unreliable electric power.
- Evacuation alarms may fail, or people may not be able to hear them everywhere in the building.
- Telephone lines may fail, and dialers fail regularly.

Test and maintain fire detection systems in accordance with the requirements of NFPA 72, *National Fire Alarm Code* (listed in Section K).

13. *How important is fire suppression?*

A fire detection system is effective only if detection is followed by **suppression**, such as fire extinguishers, stand-pipe, response by fire fighting personnel, or an automatic sprinkler system.

14. *Are fire extinguishers enough?*

An employee with a fire extinguisher often is the first line of defense when a fire starts. But first:

- Evacuate the building.
- Notify the fire department by the fastest available means, such as telephone, manual fire alarm.
- Fight the fire.

> ***Fire produces carbon monoxide and other toxic gases that affect judgment and coordination and are the major killers in fires. So, attempt to fight a fire only if you are in good physical condition, are trained, and properly equipped.***

15. *Who should know how to use a fire extinguisher?*

Every employee should know how to use the park's fire extinguishers and where they are located. OSHA Regulation Standard 29CFR, Standard Number 1910.157G1 states, "when the employer has provided portable fire extinguishers for employee use in the workplace, the employer shall also provide an educational program to familiarize employees with the general principles of fire extinguisher use and other hazards involved with incipient stage fire fighting." Standard 1910.157G2 states that, "the employer shall employ the education required upon initial employment and at least annually thereafter."

Training also should include instruction on the proper types for the most likely kinds of fires. Fire extinguishers have a label with a letter (**A**, **B**, **C**, or some combination) that tells the user what class fire it is designed to extinguish. See NFPA 10, *Portable Fire Extinguishers*, for additional information.

16. *What is the most common type of extinguisher?*

The **ABC** multi-purpose dry chemical extinguisher is the most common type in parks because it is safe for use on all fires except those involving combustible metal. Multi-purpose dry chemical extinguishers use a fine powder, similar to baking soda, to smother fire. Not all dry chemical extinguishers are multi-purpose. **Purple K** dry chemical extinguishers are designed for flammable liquid fires and may harm some objects.

> ***Don't use Purple K dry chemical extinguishers in museum spaces.***

17. *What about Halon extinguishers?*

Many parks, concerned about the residue from dry chemical extinguishers, installed Halon 1211 or 1301 extinguishers in museum collection spaces. Halon is an ozone-depleting substance. As of January 1, 1994, the United States, and the other signatories of the Montreal Protocol, in order to protect the earth's ozone layer, stopped manufacturing halon and added a heavy tax to new halon imported into the country. It has not been banned, and there is no immediate reason for parks to remove their halon extinguishers. Halon is still available and will be for some time. Still, in time halon will become hard to get, and it will be expensive. Prudence, as well as concern for the environment, suggests that you should replace halon extinguishers with other types (multi-purpose dry chemical or CO_2 extinguishers) as they are used or start to leak.

18. *What are the maintenance and testing requirements?*

Fire extinguishers should be checked monthly and must be inspected annually. See NFPA 10, *Portable Fire Extinguishers* (listed in Section K) for maintenance and testing requirements.

19. *What about standpipe and hose systems?*

A standpipe hose in untrained hands is a liability, can increase the amount of fire and water damage, and may place the person using it at risk of serious injury or death. Only physically capable, properly equipped, and properly trained employees should use a standpipe hose to fight a fire.

20. *What about sprinkler systems?*

A standard sprinkler system operates when a sprinkler head reaches its design operating temperature and opens. One sprinkler head opens at a time delivering about 25 gallons of water per minute to the fire. Most fires in sprinklered structures are controlled with five or fewer sprinkler heads opening. There are four types:

- ***Wet pipe systems*** generally are not used in spaces where the temperature drops below 32°F. An experienced fire protection specialist should evaluate the conditions before the park decides to use one of them.

- ***Dry pipe systems*** are designed for use in spaces where the temperature does fall below 32°F. Some museums use dry pipe systems to protect storage and exhibit spaces because there normally is no water in the pipe.

- ***Pre-action systems*** may be installed in areas where freezing or mechanical damage to sprinkler heads or pipes is likely. The disadvantage of a pre-action system is that when the fire detection system fails, or is out of service, the sprinkler system can't operate automatically. Routine maintenance on a pre-action system also is

more complex and time consuming than on other types of sprinkler systems.

- ***Cycling systems*** turn off when the fire is out. If it depends on the fire detection system, it also can't operate automatically when that system is out of service. Some cycling systems have a separate detection system to control the sprinklers. In either case, maintenance of the system is complex.

> ***Before selecting a sprinkler system, a structure's construction, environmental conditions, space, nature of museum collection, and protection priorities need to be studied. Consult with a qualified fire safety professional before deciding which type of system best suits your needs.***

21. *What about water damage and accidental discharges?*

When there is a fire in a sprinklered structure, only those sprinkler heads exposed to heat (usually between 165°- 225°F) open and discharge water individually to extinguish or control the fire, thereby limiting to some extent possible water damage.

> ***Sprinklers with higher temperature elements are available for special applications, such as protecting foundries, food preparation areas, or other higher temperature environments.***

Curators frequently ask about potential collections damage from an accidental sprinkler discharge. Nearly all documented accidental discharges happened because of:

- improper design
- improper maintenance
- human error

Maintenance and testing is a particularly important element in preventing accidental sprinkler discharges. NFPA 25, *Inspection, Testing and Maintenance of Water-Based Fire Protection Systems*, lists and describes the requirements (see Section K).

A sprinkler system also has to be monitored. When the fire is out, someone has to turn the system off and restore it to service.

One way to limit the amount of water a sprinkler system discharges after the fire is out, without installing a complex cycling system, is to use on-off, or controlled flow, sprinkler heads on a wet pipe system. Although they cost 5-10 times more than a standard sprinkler head, controlled flow heads may add only 5%-15% to the total cost of the system.

22. *What about other automatic suppression systems?*

Halon 1301 systems are still being used in some NPS suppression systems and portable extinguishers. Since the Montreal Protocol, however, the NPS's policy is not to install any new halon systems and to program for

replacing existing systems.

The fire suppression industry is experimenting with Halon substitutes, and several have been approved. Ansel's ***Inergen ™***, Dupont's ***FE 13***, and Great Lakes Chemical Corporation's ***FM 200 ™*** are the most popular. However, they are not drop-in replacements. To use any substitute now available in an existing halon system, you must modify the pipes, agent storage tanks, or discharge heads.

Carbon dioxide systems extinguish fire by reducing the oxygen content of the space below the point that it will support combustion or life. Thus, people must evacuate before the gas discharges or they may suffocate. Carbon dioxide is best for suppressing surface fires in service, utility, or other unoccupied areas.

23. *What do I need to know about installing mobile compact shelving?*

As parks seek to make better use of existing space, more and more of them are installing mobile compact storage systems to store museum objects. These systems eliminate fixed aisles and can expand a room's storage capacity as much as 40%. Combustible objects, records, books, and manuscripts stored in compact shelving units increase the fuel load in the room: there is more to burn, it will burn longer, and it will burn hotter. There are considerable fire risks. Before installing such shelving:

- A qualified structural engineer should evaluate the floor load-bearing capacity of the space. If the space is above grade, assess the potential impact of a fire on the floors below and above.

- A qualified fire protection specialist should evaluate the adequacy and effectiveness of systems to detect and suppress fire considering the potential for a concentrated fire load.

- You should consider modifying opening and closing procedures to include leaving open space between mobile shelving units when the area is unoccupied.

Mobile compact shelving units in the fully closed position delay both detecting and suppressing fire inside the shelving module. Closed, the shelving modules hold smoke and heat inside and can prevent water from reaching the fire to extinguish it. In a study conducted for the General Services Administration (GSA), and in later studies conducted for the National Archives and Records Administration (NARA) and for the National Library of Canada, tests showed that a fire can burn inside a closed shelving module for an hour and a half, or more, before activating ceiling mounted smoke detectors. Sprinkler operation is delayed, as well. The NARA and Canadian studies found that when compact storage modules are completely closed, severe fire damage will occur in more than one shelving module, even when fire detection and automatic suppression systems operate as designed.

Both tests showed that a small open space between shelving units reduces fire damage. NARA uses a computer-controlled system in Archives II to leave a 9" opening between the shelf units when the facility is closed or when the fire detection system activates. The Canadians use rubber

bumpers to keep an opening of 1½ - 2 inches between shelving units, and a sprinkler system that puts a large amount of water on the fire quickly. Both methods prevent the spread of fire to other shelving modules and limit damage to materials on the shelves where the fire starts.

24. *What about salvage after the fire?*

After a fire, successful salvage operations require immediate action as long as they do not hinder suppression operations or compromise life-safety.

- In a fire, the fire department is in the best position to protect museum collections from damage. Museum staff should discuss these issues with fire-fighting personnel when they are preparing, or up-dating pre-fire plans for the building. Fire-fighting personnel need to know about particularly important or vulnerable objects, and they need help establishing priorities, i.e., what should be protected first.

- The park's Emergency Operations Plan (EOP) should include the following information regarding salvage for the museum collection.

  – temporary storage for museum objects removed from the fire area

  – location of protective coverings, such as salvage covers, and how and under what circumstances they should be used

  – names and telephone numbers of contractors who can make temporary repairs, provide emergency supplies, or provide salvage services such as freeze-dry units and water extraction

  – how and where to purchase materials and supplies, how to pay for them, and how to move them

  – other sources of help (other parks, museums with similar collections that are close by, etc.)

  – instructions for placing security, fire detection and fire suppression systems back in service

  – procedures for the security, inventory and tracking of museum collections affected by the emergency

  – temporary measures to protect the collection and the structure until repairs are completed

25. *Where can I get help?*

- Consult your park or regional structural fire management officer. Specific technical assistance and information can be obtained from the following National Park Service offices:

  – Structural Fire Chief, NPS Fire Program Management Center, National Interagency Fire Center (NIFC), Boise, ID
  Telephone: 208-387-5209
  FAX: 208-387-5250

  – NPS Safety Engineer, Denver Service Center, Technical Expert, Safety and Codes, Denver, CO
  Telephone: 303-969-2196
  FAX: 303-969-2930

  – NPS Risk Management Division, Washington, DC
  Telephone: 202-208-6350
  FAX: 202-208-6756

- The security or protection services departments in most large museums, such as the Smithsonian Institution, give advice and answer questions.

- Invite your local fire department to inspect spaces housing museum collections. Consult regional, county and State Fire Marshall's offices and Fire Prevention Bureaus for additional information and guidance on fire safety.

- You should obtain copies of the National Fire Protection Association's recommended practices. These documents contain useful information on fire prevention, detection, suppression, and safety self-inspection. See Section K for a list of these publications.

E. Operational Security

When designing a new security system, or redesigning your existing one, you will want to reduce or remove the risks you have identified. Then you can develop and implement your day-to-day operating procedures, as well as your emergency procedures. Finally, you will need to train the staff on the new or revised system.

1. *What are some of the design issues I should consider?*

The value of cooperation in security planning is never more apparent than in the design phase of a new project--a new exhibit, a new storage facility, or refurnishing and restoring a historic structure. Working together, curators, security specialists, architects, engineers, exhibit designers, historic preservation specialists, interpreters, maintenance personnel, and fire safety professionals often can resolve security issues before they become a problem. Before you start work, prepare a written list of minimum security standards to include:

- proximity of staff to the exhibit area

- tours--size, type (self-guided versus staff-guided) and tour route

- proximity of exhibit objects to the tour path
- features that limit public access to exhibits

> ***The Architectural Barriers Act of 1968, Section 504, and the Americans with Disabilities Act of 1990 require museums to be as accessible as practicable, both architecturally and programmatically. The NPS has installed equipment to make structures accessible to the mobility-impaired. In some historic structures, for example, access equipment is located out of public view to minimize the visual intrusion, and disabled visitors are routed through otherwise closed spaces. In the rare instances where an alternative access route goes through exhibit spaces, the planning team must consider the impact on the security of exhibit objects and their vulnerability to accidental damage.***

- security issues raised by making exhibits accessible for people with disabilities
- vulnerability of exhibit objects to theft, vandalism, touching and accidental damage

You should resolve these and any other security issues before the design is approved to avoid the need to make costly corrections later.

Be aware that technology is developing so fast in some areas (such as computers and detection systems) that it may make sense to select the technology as close as possible to completion of the project, provided this does not require significant changes in the structure.

Finally, document **all** decisions.

2. *What should I cover in our day-to-day operational policies and procedures?*

The need for these detailed, day-to-day policies and procedures is to control access to vulnerable objects, a key element in your security program. The key in protecting museum collections is to allow reasonable access without creating undue risk. How? By controlling legitimate access while preventing unauthorized or unnecessary access.

Security programs depend on trusted agents, such as our Park Service employees, but even so, one individual should not have the freedom to care for and account for museum collections without routine oversight by someone who understands the system well enough to spot discrepancies. Your access control policy must include inspection, oversight, and audit safeguards to reduce the risk.

3. *What should I include in an access policy?*

When writing an access policy, include the following elements:

- statement of purpose
- general access procedures
- general guidelines for employees, scholars, researchers, visitors,

service vendors, emergency response personnel, and others who are eligible for access to the museum collections

- conditions that justify access
- superintendent's signature

See *MH-I*, Appendix G: Protection of National Park Service Museum Collections, and *MH-II*, Appendix D: Museum Archives and Manuscript Collections, for sample access policy and procedures.

4. *What else should I do regarding access?*

- Know the people who have access to the collection. The more access someone has, the more you should know about him or her.
- Look for other ways for the person to accomplish his or her objective without allowing access to original pieces.
- Specify how someone receives authorization for access to collections:
  - Who is authorized to grant access?
  - How much access can they grant (i.e., escorted, unescorted)?
  - What justifies granting access?
  - When are escorts required?
- Keep access lists up-to-date and make sure they are used routinely.
- Specify minimum parcel control procedures:
  - Limit the size of parcels visitors are allowed to carry into collection areas (anything larger than 11" X 15" can be a problem).
  - Search parcels larger than 11" X 15" if they are taken into research or non-public areas by non-employee researchers.
  - Use property passes to identify personal property taken out of the building by employees.

5. *Why should I be concerned about key control?*

Barriers and locks are the most common tools used to accomplish the objectives of your access control policy. While keys are a symbol of trust, as well as a way of controlling access, the key as status symbol sometimes overrides the importance of the key as a tool for access control.

The fewer keys there are, the better.

- Keys multiply over time, particularly at the master and grand master levels. Unchecked, this quickly compromises the access control program.
- Good key control requires ongoing maintenance and cooperation by all staff.

- Lost or stolen keys to museum collection spaces, such as storage or exhibit cases, increase the risk of loss.
- Lack of accountability invites unauthorized possession and duplication of keys.

6. *How do I control keys?*

Ask your superintendent to sign written procedures that:

- Designate one person as responsible for controlling keys, including issuing or transferring keys, having keys made and inventorying keys annually.
- Designate, by name, those authorized to have keys to museum collections storage spaces and exhibit cases.
- List the responsibilities that go along with having park keys:
  - safeguarding keys
  - reporting lost keys
  - returning keys when they are no longer needed
- Require a signed and dated Receipt of Property Form, DI-105, or its equivalent, when keys are issued.

7. *What should I do to safeguard keys?*

First, decide where and how to store spare keys and operational keys that remain on-site; then, think about off-site concerns.

In an ideal world, no keys would leave the park, but this is almost never possible, therefore:

- Designate which keys employees can take off-site.
- Specify limitations on taking keys off-site (overnight versus a two week vacation).
- Restrict the number of keys that leave the park, and be sure that grand master keys never leave the park (if lost or stolen the whole key system is compromised).
- Place keys to museum exhibit cases and specimen storage cabinets in a key cabinet (located in museum storage, where possible) or some other appropriate locked container at the end of each day.
- Limit access to the curatorial key cabinet to the curatorial staff.
- Keep other keys in a key cabinet in a protected space that is convenient for opening and closing.
- Lock up any keys that are not in use.
- Store spare removable cylinder cores and core removal keys in a safe,

preferably separate from key blanks.

8. *What about access to keys in emergencies?*

Specify in your key control policy who may obtain keys in an emergency, how to get them, and where they are kept.

9. *How do I ensure accountability?*

- Develop audit and inventory procedures.
- Report results of the inventory to the superintendent.
- Review key control records annually to make sure they are current.
- Make sure all museum keys are returned by transferring museum employees.

10. *What should I do if a key is lost or stolen?*

When a key is lost or stolen, the only sure way you can protect the facility is to rekey every lock it opens. If the missing key is a master, or grand master, then you should rekey all the locks.

11. *Are combination locks better than keyed locks?*

Combination locks have many applications. File cabinets and secure areas used by a large number of employees often have combination locks. The gate to a vehicle storage area is an example. Other applications include very high security areas, such as safes and vaults, where the physical existence of the key poses a threat because of its vulnerability to loss, theft, or unauthorized use.

Combination locks have advantages and drawbacks. For example, while it is easier and less costly to change a combination than to rekey a lock, these locks can also be greater security risks. Why? Because many find it difficult to remember random number combinations. They:

- write down the combination (a quick look around a safe or file cabinet often turns up the combination written on something close by),
- use number combinations that are easy to defeat, or
- use birth dates or other number combinations easily associated with the safe's custodian.

Because of such security concerns, be sure that you change combinations annually, or when anyone with the combination transfers or quits, or whenever evidence suggests the combination has been compromised.

Also, you will want to seal a written record of the combination in an envelope designed to show evidence of tampering and keep it in another safe. Finally, do not forget to protect change keys/wrenches and the instructions for changing combinations from unauthorized use.

12. *What should I include in opening and closing procedures?*

The best access and key control programs in the world are of no value if you do not open or close the facility properly. Written opening and closing procedures provide a checklist for transitioning from one condition to the other and, at a minimum should:

- Identify who may open or close.

  If you designate who has authority to open a building or controlled area, you establish both the responsibility and the authority to control access.

- Specify locking and unlocking sequences and paths.

  There should be a clearly defined entry and exit procedure. The person opening the building should enter at a designated point, and the person closing the building should leave the same way.

- Require checking for stay-behinds.

  Don't forget to inspect the building for someone trying to stay behind after closing.

  – Buildings often have places someone can hide (closets, stairways), so the first step to prevent a stay-behind is to keep potential hiding places locked while visitors are in the building.

  – For potential hiding places that cannot be locked, consider local daytime intrusion detectors to alert staff when someone enters them.

  – When closing the building it is important to search it in a systematic way--start at the top, work down and out.

  – Where possible, lock areas of the building as they are inspected to prevent someone moving back into a space after it is inspected.

  – Written procedures should highlight vulnerable areas for special attention.

  – It may be possible in a large building to activate the intrusion detection system by areas to detect someone trying to get back into an inspected area.

See *MH-I*, Appendix G: Protection of National Park Service Museum Collections, for sample opening and closing procedures.

13. *What else should I include in the opening and closing procedures?*

Opening and closing procedures should include:

- Alarm system information--include arming and disarming sequences.

Don't include alarm codes in the written procedures.

- Doors and windows to be opened and closed.
- Mechanical system information--how to activate and secure, systems that should be on when the building is open and off when it is closed, location of controls, and how to operate them.
- Potential fire hazards--locations of coffee pots, hot plates, and other heat producing devices (all of which should be turned off and unplugged at the end of the day).
- Opening procedures, such as the need to:
  - look for signs of unauthorized entry or theft
  - inventory particularly valuable or sensitive objects
  - check for unusual conditions (e.g., leaks in roof)
  - make sure all objects on exhibit are in place
  - make sure cases are locked
- Other site-specific conditions that require attention.

14. *What about the park's crime prevention and physical security plans?*

The park's crime prevention program should include:

- leadership and participation by management in developing and operating the security program
- regular security surveys by qualified personnel and provisions for corrective actions
- orientating and training all employees (permanent, temporary, seasonal, and volunteers) in security awareness, with emphasis on each employee's security responsibilities
- an appropriate level of security for all park property-- including museum collections, capital equipment, supplies, buildings, money, firearms, and historic sites, monuments, and ruins
- procedures for guides, reception desk personnel, and cashiers to surreptitiously summon help in an emergency or when a visitor becomes unruly
- an annual review of the park's crime and security problems followed by implementing preventive measures
- appointing a full time or collateral duty Physical Security Coordinator

15. *What should I include in the Emergency Operations Plan?*

Be sure that protecting the museum collection is in the park's Emergency Operations Plan (EOP). See *MH-I*, Chapter 10: Emergency Planning, for guidance on museum collections emergency planning. Staff should be trained to act promptly in an emergency and should be prepared to remove museum collections after seeing to the safety of visitors and other staff.

The Emergency Operation Plan should include specific information regarding:

- command and control
- controlling access in an emergency
- location of emergency keys
- inventory and location of emergency supplies
- location and operating instructions for fire extinguishers, fire alarm equipment and other fire suppression and emergency response equipment
- emergency telephone numbers for assistance--both on-site (curators, conservators) and off-site (regional/SO personnel, other cooperating agencies and institutions, commercial recovery firms, and emergency response personnel)

16. *What should I include in staff training?*

The final and most important element in your operational security program is staff training. Written policies and procedures are valuable only if all employees know what they are and how to implement them. Staff training should be specific and cover all basic security practices. Hold mandatory training sessions regularly.

Be sure to include these topics in the training:

- importance of routine security measures, such as locking doors and windows when the building is unattended
- importance of routine inventories of objects on exhibit and in storage
- reminder that theft is preventable
- reminder that most thefts are spontaneous events that occur because of simple oversights
- importance of maintaining the integrity of non-public spaces by challenging those who are not members of the staff when they are in these areas without an escort
- fire safety
- routine and emergency operations
- use and maintenance of equipment

17. *Where can I get help?*

For additional information, contact your park or regional/SO protection staff and regional/SO curator. You can also consult:

- The security or protection services departments in most large museums, such as the Smithsonian Institution, for advice and answers to specific questions.
- The American Society for Industrial Security's (ASIS) Standing Committee on Museum, Library and Archive Security. Members of the Standing Committee will give advice on specific problems. Call ASIS headquarters at (703) 519-6200, or visit their website at <http://www.asisonline.org>. You can also order their publication *Suggested Guidelines in Museum Security.*

F. Physical Security

While the previous section of this chapter discussed the concept of designing for security, this section examines the specific physical security elements you can use to satisfy your security standards. You can also incorporate these elements into existing facilities to help remove or reduce threats.

1. *What is physical security?*

Physical security includes all measures intended to prevent acts of violence against persons and destructive or unauthorized access to or removal of property. Physical security elements deny, delay, or discourage criminal acts, and are the means for achieving the objectives of the access control policy.

Physical security is a **crime prevention** tool. Three factors have to be present for a crime to occur:

MEANS + MOTIVE + OPPORTUNITY = CRIME

The criminal brings **MEANS** and **MOTIVE** to the crime. There is little we can do to remove them from the equation. We can use physical security measures, however, to remove or limit **OPPORTUNITY**.

2. *What are the tools of physical security?*

There are many, but the primary ones are:

- barriers
- locks
- lights

3. *Why do I need barriers?*

Barriers limit access by delaying the intruder, by making the intruder visible, or both. Given enough time a determined person can breach the most elaborate barrier, but you can discourage entry by increasing the time it takes and the chances of being seen, and by encouraging the thief to look for an easier target elsewhere.

Typical barriers might include:

- Park boundaries
  - natural barriers (e.g., ravines, mountains, water)
  - fences
  - well lighted open spaces
- Building structure
  - walls
  - foundations
  - roof
  - doors
  - windows
- Interior barriers
  - storage rooms
  - cabinets
  - vaults and safes
  - cases
  - temporary or permanent exhibit barriers

4. *How many barriers are enough?*

Figure 9.1 illustrates how you can use barriers to protect valuable objects:

- Add barriers, like the rings of the bull's-eye, to protect high value objects.
- The more valuable the object, the more rings you need.
- There have to be enough barriers to delay entry until the responder arrives.

5. *Why do I need locks?*

Properly designed and installed locks are one of the first lines of defense in a museum protection program. The locking system should not rely on

- warded locks
- spring latches
- deadbolts less than ¾" long

- key-in-knob locks
- locks installed with screws ½" or less in length

> ***A lock is no better than the door it is on or the strike and jam the bolt fits into, and even the best quality lock is of little value without an active key control program.***

Most historic structures have old style locks on exterior doors. Authenticity considerations do not allow changing to modern locks in most cases. Where this is true, the park should include additional protection features, such as alarms, to supplement the locks.

6. *What criteria should I use in selecting locks?*

An effective locking system must fit the needs of the park and of the space it protects. Many types of locks are available, but they are not all equally effective in all circumstances. Isolated spaces and high security areas need heavy-duty locks.

7. *What is required for museum storage spaces?*

Museum storage spaces should have metal or solid-core wood doors. Each door should have:

- a dead bolt lock
  - 1" or longer bolt
  - exclusive non-mastered key code
- hinges located with pins are on the secured side of the door (When this is not possible, spot-weld the hinge pins so they cannot be removed, or replace the existing hinges with hinges that have non-removable pins.)

You may want to use a proprietary or regionally propriety keyway--a lock system with a keyway the manufacturer guarantees not to sell to anyone else within a specified area. Keys for a proprietary keyway must be made by the manufacturer, or the park must purchase specialized key cutting equipment. The advantage is that the local hardware store cannot duplicate the park's keys.

8. *Why is an effective lighting system important?*

Good lighting makes criminals nervous because it increases the chances of detection and identification. It has the opposite effect on employees and the public. Light increases the public's perception of the safety of an area and lets law enforcement patrols see what's going on and detect the physical signs of a break-in.

It is not the intensity of the lighting as much as the evenness of the illumination that makes a lighting system effective. The area should be free of glare and shadows. Lights close to structures should illuminate toward the structure, not out and away from the structure. A properly designed lighting system eliminates hiding places and facilitates the ability of

security patrols to observe.

9. *Is lighting always necessary?*

Under some conditions lighting may attract unwanted attention to the site. In isolated rural areas, for example, a well-lighted building in an otherwise dark landscape makes an attractive target. Some parks have found that lighting remote parking lots also can bring unwanted visitors, making the lots a local hangout. In both cases, you may want to use time-clocks so the grounds or parking lots are lighted when legitimate visitors are using them, but dark afterward.

10. *What about light for closed circuit television (CCTV)?*

Exhibit areas and visitor centers may use closed circuit television (CCTV) as a protection and control tool. A video recorder makes CCTV useful for after-hours protection by visually documenting unusual conditions. CCTV is also useful to those responding to intrusion or fire alarms. The cameras provide a quick way to survey a large building.

If exhibit objects could be damaged by light, cameras are available that need little background illumination. Infrared illuminators also are available to boost the efficiency of CCTV cameras where visible light levels must remain low.

Where CCTV is part of the protection system, after-hours lighting is an important consideration.

- Motion detectors can turn on lights and the VCR.
- In a large building, you may want to have central light controls, so specific areas, or the whole building, can be illuminated at once. Low voltage remote control switches are well suited to that purpose.

11. *What is the value of human presence?*

A human presence or response is a critical element in any physical security system. The mere presence of a person on the site is a deterrent. Of more importance, however, is a prompt response by a trained person when an attempt is made to breach the physical security of the site.

12. *Where can I get help?*

Refer to the following resources for additional information:

- NPS law enforcement and physical security specialists.
- Your regional/SO curator.
- The security or protection services departments in most large museums, such as the Smithsonian Institution, for advice and answers to specific questions.
- The American Society for Industrial Security's (ASIS) Standing Committee on Museum, Library, and Archive Security. Members of the Standing Committee will give advice on specific problems. Call the ASIS Headquarters at (703) 519-6200, or visit their website at <http://www.asisonline.org>. You can also order their publication *Suggested Guidelines in Museum Security*.
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G. Electronic Security Systems

Electronic systems (e.g., CCTV, alarm systems) are only extensions of staff eyes and ears; they only provide information. There are four important questions you should answer before selecting an electronic security system to protect museum collections.

- What is the threat?
- How vulnerable is the collection?
- Are there restrictions on the installation?
- What should the system do?

1. *What is the threat?*

Learn as much past history as possible about thefts, acts of vandalism, accidental damage, and wear and tear on furnishings.

2. *How vulnerable is the collection?*

Go through room by room and identify museum objects that are vulnerable to theft, accidental damage, and wear and tear from visitor touching (whether purposeful or inadvertent).

3. *Are there restrictions on the installation?*

With the range of technology available, devices in period rooms do not have to be intrusive. Some security specialists argue that making detectors visible acts as a deterrent. Others make the case that visible detectors give away valuable information a thief can use to defeat the system and allow the potential burglar to spot weak points. Management has to make the final decision based on the level of the threat, the value and vulnerability of the collection, and the interpretive objectives. There is no completely right or wrong answer.

If you do use visible detectors, there are several things that can be done to minimize the information the potential thief can get while walking through the building.

- Mix visible and hidden devices. Visible detectors signal the would-be thief that there is a protection system, while the hidden devices provide back-up if the thief tries to exploit perceived weaknesses.

- Many parks leave the walk-test lights active on motion detectors. These lights are there so the installer can test the detector and measure the area it covers. Active walk-test lights give the same information to a would-be intruder. There are two schools of thought on how you might protect a space with motion detectors: position detectors to

cover areas the intruder most likely will cross (creating traps), or install enough detectors so the intruder cannot move more than 6" undetected anywhere in the space.

As an added deterrent, you can also leave walk-test lights active where there is 100% saturation coverage, although such coverage is expensive and more intrusive in a period room. Designers usually specify saturation coverage for vaults and other highly protected spaces. Where detectors create traps, the walk-test lights should be disabled. On most detectors this involves changing a switch or jumper wire inside the detector. Follow the instructions that accompany the detector. If all else fails, a piece of tape covering the light serves the same purpose.

- Damage to historic fabric

  – Be sensitive in placing security devices so as to prevent unnecessary damage and ensure that necessary damage is repairable.

  – Be aware of vertical and horizontal spaces where installers can run alarm wire.

  – Know if other work is planned that will open walls or ceilings. This may help with the placement of detectors.

  – Where physical or aesthetic considerations limit the ability to run wire, consider using wireless alarm devices so you don't have to penetrate surfaces. A combination of hard-wired and wireless devices may be optimum in many historic buildings.

- Placement of furnishings

  – The location of furniture in a room greatly influences the type and location of detectors that will be appropriate. Furniture can block a detector, making it ineffective, or, used properly, furniture can help disguise a well-placed detector.

4. *What should the system do?*

- If you install a **daytime alarm system**, is it more important to deter the act or catch the person who commits the act? If deterrence is preferred—as it normally should be—the design will include audible and visual indications that the act has triggered an alarm. If apprehension is preferred, audible and visual alarms may defeat the purpose.

- A **nighttime alarm system** has both deterrent and apprehension objectives. First, decide if a silent alarm, that summons law enforcement personnel, or a noisy one, that both summons law enforcement personnel and draws attention to the site, is the most effective.

  A silent intrusion detection system is more likely to lead to catching the intruder. And, in a populated area, an intrusion detection system

sounding a loud horn or turning on lights may scare the intruder away empty handed. The determining factor should be a reasonable estimate of how much time the intruder needs versus the length of time before someone notices the alarm and takes action to stop the theft. If it only takes a few minutes, then doing everything reasonable to prevent the loss must take precedence over apprehension.

- **Personal Protection Alarms** allow people working in the building the ability to summon help quickly and silently, especially where assault, robbery, or harassment is a threat. (The reception desk in an urban park headquarters building located in a high crime area is a good example.)

  Personal protection alarm systems (duress or panic alarms) can use small push-button radio transmitters, worn either as a pendant around the neck or on a belt, for protection of staff members who must move around in the course of their work, or fixed position transmitters for personnel at fee collection or sales shop cash registers.

5. *What factors influence a system's design?*

- Know who the responders are, where they are located, and the resources they have.

- Know how long it will take the responders to get to the site at different times of the day. Many jurisdictions have more police on duty between 4:00 p.m. and midnight than other times, but they are busier during that period. Rural areas may have only one or two officers on duty, each covering many square miles of area.

  Where response time is long, the security system must include both electronic and physical security elements to be effective. If it takes the first responder 15 minutes to get to the site after the alarm sounds, then, to prevent the thief from taking an object it must be physically impossible to remove it in less than 15 minutes:

  – It must be large and heavy enough to delay removal.

  – It must be located in a room or vault that will withstand a determined attack for more than 15 minutes.

  – It must be in a case that can withstand attack until help arrives.

  – It must be some combination of the above.

Otherwise, the alarm only indicates someone entered the building and something may be gone.

- Think about what the responders know about the site. Consider access to the site, familiarity with the physical layout, and the responder's general level of training.

- Decide what information is needed by thinking about what will be done with it. Electronic systems provide all kinds of information. The more complex the system, the more costly it is to maintain, and the

more important it is to maintain it regularly. Just as you would not under design an electronic security system, do not over design it.

- Determine the system's operating parameters. Some objects on display may need 24-hour individual protection. Value, replaceability, sensitivity to controversy, ease of sale, and vulnerability to damage. Precious metals, gems, firearms, edged weapons, currency, coins, jewelry, original documents, rare books, and stamps are all candidates for 24 hour protection systems.

- Identify how you will need to change operations. You can determine which changes are necessary by considering these issues:

  – Electronic systems complicate access, even for authorized personnel.

  – Electronic systems create the need for additional staff training.

  – Someone has to manage the electronic system.

  – Those operating, managing, and maintaining sophisticated electronic systems need different skills than those using less complicated systems. An electronic system may, in some cases, require more staff.

  – It is very expensive to contract out all routine maintenance and minor repairs. If no one in the maintenance division can take care of them, money must be programmed into the budget, or someone must be trained, or both.

- Consider the following park specific issues:

  – The schedule for opening and closing the structures when staff arrive and depart, and visitor hours.

  – The procedures and staffing needed for opening and closing the structure.

  – The number and location of people on duty at any given time governs the nature of the response to daytime alarms and influences where and how to display the alarms.

  – The visitor tour path and direction, the number of persons on a tour, and the number of staff with each tour group help determine daytime alarm needs.

    When all visitors are in tour groups, closely monitored by staff at all times, there may be less reason to install sophisticated alarm devices. However, when visitors wander freely through a structure, and there are not enough staff to provide surveillance, electronic protection for objects becomes more important.

  – You need to know the parts of the structure that are off-limits to visitors. Define the nature and level of access control needed in those places, and identify who is allowed in and under what

circumstances. Provide information about physical access control measures, such as locks, and indicate whether to incorporate card readers, numeric keypads, or other devices into the overall alarm system.

- Study the environment. Where the components will be installed determines which technology you select. For example, if the building is reinforced concrete, or has a large amount of metal in the structure (including, perhaps, metal foil backed wall paper) then a wireless system may be a poor choice. Ambient temperature, humidity, and dust levels also are important considerations.

- Consider not only who responds, but also who monitors your system. With CCTV, for example, experience shows that someone can watch a monitor for about 30 minutes before it starts to become part of the visual background. This suggests the person assigned to monitor the system should be rotated every half hour. If not, then the system must include additional devices to identify potential threats and attract the operator's attention, such as a video motion detector.

- Observe the physical characteristics of the exhibit. For example, in a museum gallery where many people are present, color CCTV displays make it easier to distinguish and describe an individual. Where the camera is located in a little-used hallway, however, less expensive black and white monitors are usually sufficient.

6. *What are the types of intrusion detection devices?*

There is no cookbook way to design an effective intrusion detection system. Each protection problem is different, and the design of the intrusion detection system must reflect this. If not, the system will not provide effective protection, or the nuisance alarm rate will destroy confidence in it. Figure 9.5 describes commonly used intrusion detectors, how they detect, where to put them and common sources of nuisance alarms.

Each detector has strengths and weaknesses so an intrusion detection system that relies on one type has all the weaknesses of the detector selected. For example, using only contacts to protect doors, windows, and cases makes the building vulnerable if the intruder breaks the glass in a window and enters through the hole without raising the sash. Glass-break or motion detectors complement and provide back up for perimeter and case protection detectors.

TYPE	WHAT IT DETECTS	WHERE TO PUT IT	COMMON SOURCES OF NUISANCE ALARMS
Passive Infrared (PIR)	• Movement of an infrared heat source (in the range generated by the human body	• Best located so intruder's path of travel crosses the detection zone of the detector; least effective where intruder's path of travel is directly toward or away from the detector. • Aimed at a wall, floor or ceiling with a stable background temperature located within the design range of the detector.	• Heat sources (radiant heaters, hot water pipes, heat supply grills, etc.) • Surfaces heated quickly by the sun (metal doors, large areas of glass, etc.) • Aimed into open space, no stable background within detector range (for example, aiming a detector with a 50' range into a space 75' wide). Hot air moving at the detector's outer range can cause alarms. • Temperature extremes (below 32°F or above 100°F). • Small animals, such as cats, dogs, raccoons, large rats. Birds generally are not a problem. • Large amounts of dust. • Large electric motors, air compressors that cycle on and off.
Photoelectric Beam	• Movement of a solid object crossing the infrared light beam.	• Large open spaces • Out-door applications • Period rooms or other locations where an unobtrusive detector is desirable. The transmitter and receiver can be disguised or mounted inside a wall or other structure, although the transmitter must have a clear path to the receiver. If not hidden or disguised the intruder can step over or go under the beam.	• Birds or large insects. If used outside, set the beam far enough off the ground to let small animals cross the path, or the area must be fenced to keep them out. Stacked arrays or multiple beams can compensate for this. • Accumulations of dust, although more sophisticated devices compensate for gradual changes caused by environmental conditions.
Microwave Motion Detection	• Changes in microwave frequency. The detector transmits and receives electromagnetic energy in the microwave range (radar). Microwaves leave the transmitter, bounce off the target back to the receiver. The detector operates on the doppler effect (the frequency of the microwave energy changes as a target gets closer to or further away from the detector).	• Best located so intruder travels toward or away from the device. A target that stays exactly the same distance from the device, but moves laterally to it, may not be detected. • Can be mounted behind some solids (microwaves will penetrate 1" or more of wood. Useful where visual intrusion is a concern (place detector inside a piece of furniture, behind wainscoting, etc.) • Aimed at a solid structural feature (masonry wall, etc).	• Two devices in the same room operating on the same frequency. (One detects energy radiating from the other, causing unwanted alarms. Not a problem if detectors operate on different frequencies.) • Detector aimed at an outside wall fronting on a busy street, or a thin wall with foot traffic close to the building. • Aimed at a window or glass door. (Glass is invisible to microwave.) • Aimed at objects that move under normal conditions (curtains in the path of an air supply or draft from a door or window, for example).

Figure 9.5. Types of Intrusion Detection Devices

TYPE	WHAT IT DETECTS	WHERE TO PUT IT	COMMON SOURCES OF NUISANCE ALARMS
Ultrasonic Motion Detection	• Changes in high-frequency sound. Similar to microwave, except uses high frequency sound energy.	• Similar to microwave, but does not penetrate solids, including glass.	• Strong air movement. • Aimed at object that moves under normal conditions. Unwanted alarms make these devices unpopular except where used with another technology (PIR or microwave in dual technology devices). Stable when used inside vitrine cases (alarms if cover is removed or broken).
Dual Technology Detectors	• Detector combines two technologies (e.g., micro-wave and passive infrared or ultrasonic and passive infrared), Activation of both technologies needed for alarm. Fewer unwanted alarms when used properly.	• Same general considerations as other motion detectors.	• Environmental conditions or installation that voids one of the detection technologies (see above).
Sonic Sensors	• Sound in the frequency range associated with movement.	• Quiet locations such as inside a vault.	• Vibration, shock, and some ambient noise conditions.
Passive Audio Sensors	• Any sound in the protected space.	• Quiet locations such as inside of a vault.	• Ambient noise.
Contact Switches	• Opening or closing a mechanical switch—includes magnetic door and window contacts, plunger switches, and roller or ball switches. Magnetic contacts are in two parts: a magnet mounted on a movable surface and a switch mounted on a fixed surface. Moving the magnet away from the switch causes the device to go into alarm. Properly installed, they are stable with a low failure rate.	• Doors, windows, hatches, etc. • Exhibit cases, object protection (e.g., plunger switch under a object to detect movement of the object.) • If there is a large gap between the magnet and the contact switch (e.g., the door on an historic building is warped or fits loosely), a larger magnet may stabilize the alarm. If warping at the top and bottom of the door is extreme, install contacts near the latch. • Mount magnetic contacts on top or bottom of door about 6" from the latch edge. • Magnetic contacts mounted on the hinge edge of the door allow the door to open enough to enter without an alarm. Use roller or ball switches for this.	• Flimsy doors that rattle excessively in the wind • Doors that shrink or swell excessively as weather and the seasons change • Wide gaps between the magnet and the contact switch caused by settling of the building • Overhead doors with excess up and down movement when locked.

Figure 9.5. Types of Intrusion Detection Devices (continued)

TYPE	WHAT IT DETECTS	WHERE TO PUT IT	COMMON SOURCES OF NUISANCE ALARMS
Capacitance Motion Detection	• The device generates a capacitance field 4-6" from the protected object. Detects any electrical conductor that enters the field. • Most sound a local alarm to let the person know he or she is too close. Used to prevent touching--alarm sounds before person touches the protected object.	• Primarily used in museums to protect high value wall hangings or paintings from touching. • Must be used with physical barriers to prevent accidentally getting too close to the protected object.	• Lack of physical barriers to prevent visitors from accidentally getting too close to the object. • Requires frequent adjustment, and is sensitive to humidity and moisture.
Pressure Mats	• Pressure	• Usually placed under a rug or carpet to detect an intruder who steps into the protected space. • Period rooms with a rug or floor cloth.	• Lack of barriers to prevent visitors from stepping into protected area accidentally.
Vibration or Shock Detection	• Vibration or shock	• Attached directly to the protected object, an exhibit platform, or the structure of an exhibit case.	• Vibration from a train, trucks or cars on a busy highway, or an air handler that cycles on and off. Some have adjustments to screen out ambient vibration.
Glass Break Detection	• Frequency Discriminators: A sound detector activated by frequencies generated by breaking glass. • Metallic Foil or Wire: A ribbon of lead foil or small wire that acts as an electrical path. Attaches in a pattern around the outside of a window glass. Breaking the glass breaks the electrical circuit to activate an alarm.	• Frequency discriminators can be concealed near the protected glass. • Foil must be mounted directly to the protected glass (limiting its usefulness in historic houses with original glass).	• Frequency Discriminators: Clicking sounds, such as the sound of a heel tap on a tile floor, air moving through supply and return grills in the HVAC system, pipes heating and cooling, and some equipment noises. • Foil: Accidental damage and damage from water, sun, and temperature changes.
Strain Sensors	• Detects elongation of the under side of a joist, floor, or platform that occurs when weight is applied to the top surface.	• Underside of floors, stair treads, and other surfaces an intruder might walk over. • Under surfaces supporting high value objects to detect removal of the object. The sensor adjusts for weight normally on the surface. After it adjusts, the device alarms if the weight increases or decreases.	• Large animals with access to the protected area.

Figure 9.5. Types of Intrusion Detection Devices (continued)

7. *What are the most common causes of a false alarm?*

There is no such thing as a false alarm. An electronic detection system alarms because something approximates the conditions that one or more of the components of the system are designed to detect.

- If a rat runs in front of a microwave detector, it should alarm. The rat's movement has all the qualities that the detector was designed to detect. The alarm may be unwanted and a nuisance, but it is not false. To stop unwanted alarms like this, either select another type of detector that will not register the movement of the rat, or get rid of the rats!

- Power-induced alarms are unwanted, but power fluctuations can mimic the conditions the system is designed to register. The fix for this problem is to clean up the power supply.

The primary cause is human error. Someone either forgets to turn the system off, turns it on or off incorrectly, or accidentally triggers the system in some other way. The solution is either educating the users better or simplifying the system. Poor system design and lack of maintenance are other causes.

8. *What can I do to reduce the number of false alarms?*

Think about the conditions the system is designed to detect and then look for those conditions or conditions that mimic them. Look for patterns in the alarm records. For example, protection staff at a park noted a passive infrared detector in a loading dock often went into alarm between 6:30 a.m. and 8:00 a.m. Examining the area showed the device was aimed at a metal roll-up door facing east. As the sun came up and heated the door, infrared radiation inside the loading dock put the device into alarm. Repositioning the device cured the problem.

9. *What are other design considerations?*

Electronic access control systems can stand alone, or they can be computer controlled. Some use cards, some use keypads, and some use both. Some can be integrated with a CCTV system. The advantages are:

- You can customize a person's access to a particular area at a particular time. High security areas can be programmed to require two authorized people before entry is granted.

- A lost card can be programmed out of the system and does not have to be recovered (unlike a lock system where a lost key requires extensive and expensive rekeying).

- The system can provide a record of who entered a space and when.

Closed circuit television (CCTV) systems can improve the efficiency of the protection staff. With CCTV one person can monitor multiple and remote locations. CCTV does not replace personnel, however; someone always has to respond to prevent losses.

Lighting is also an important consideration in the design of a CCTV system. See the discussion on lighting in Section F.

Electronic exhibit and case protection systems require technical input from

someone familiar with the design of exhibit and case protection systems.

Many of the detectors discussed in Figure 9.5 are useful for protecting exhibits and cases. As with intrusion detection systems, there is no cookbook way to protect cases or exhibits.

Alarm response time is critical because exhibit and storage cases are the innermost rings of the bull's-eye. They directly house the objects we most need to protect. When the thief is inside the case or exhibit, the loss is imminent. At that point only the exhibit mounting stands between the thief and the object. If vandalism is the intent, the object will already be damaged.

Electronic system maintenance components are sensitive to heat, cold, dust, lightning, power fluctuations, power outages and mechanical damage, and must have regular routine maintenance to operate as designed.

System maintenance can be contracted out, although as a rule, standard maintenance agreements do not cover damage from electrical power problems, lightning, accidental or deliberate mechanical damage, or natural disasters. Repairs not covered by the maintenance agreement usually are made on a time and materials basis. The alternative is to train or hire in-house staff to maintain the systems.

10. *Where can I get help?*

You can obtain additional assistance from:

- Park or regional/SO protection staff.
- Your regional/SO curator.
- The security or protection services departments in most large museums, such as the Smithsonian Institution, for advice and answers to specific questions.
- The American Society for Industrial Security's (ASIS) Standing Committee on Museum, Library, and Archive Security. Members of the Standing Committee will give advice on specific problems. Call ASIS headquarters at (703) 519-6200, or visit their website at <http://www.asisonline.org>. You can also order their publication *Suggested Guidelines in Museum Security.*
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H. Protecting Collections in Transit

Museum objects are at greatest risk when in transit from one place to another. Whether in the custody of a courier, a bonded mover, or the U.S. mail, the act of transporting objects exposes them to risks not encountered in the park. Deciding how to transport a museum object safely, how much protection to provide, and how much it will cost, demands a rigorous analysis of the risk. Consider the following issues before consigning museum objects to a mover.

1. *What are the object's characteristics?*

Consider the object's value (monetary, historic significance), its vulnerability to theft or damage, and its physical characteristics, that limit the appropriate means of transportation such as size, weight, and composition.

2. *What means of transportation should I select?*

Objects that are especially vulnerable to theft or damage or that have significant value should be carried by the most secure means possible. That may mean a courier, a contract carrier, or both.

The most significant threat to an object in transit is a transportation accident. Like a fire, an accident involving the transport vehicle can destroy everything in it. The prospective transporter's safety record should be a significant factor in selecting a carrier.

3. *How should objects be handled in transit?*

Discuss special handling considerations with the transporter. For example, mechanical lifting devices, such as forklifts, should not be used for most categories of museum objects. Spell out these requirements to the transporter in advance.

4. *Is chain of custody important?*

Yes! A courier is the optimum way to handle chain of custody. However, except for very important objects, a courier may not be practical because of the cost. Nevertheless, it is vital to define how accountability transfers from one person or organization to another.

- Establish inventory procedures that do not require the objects to be unpacked when custody changes.

- When the objects are transported by a bonded mover, the contract should state that the driver will not leave the truck unattended for breaks, meals, or any other reasons.

5. *What about intermediate stops?*

Long distance movers often route objects from one place to another by way of central collection points, much as an airline routes passengers to one city via a hub in another. Intermediate loading and unloading of museum objects increases the risk of damage significantly.

If possible, museum objects should be moved directly from point A to point B with no intermediate unloading and reloading. If the values do not justify the cost of direct, non-stop routing, try to keep intermediate stops to a minimum.

If objects are placed into temporary storage along the way, the warehouse

should be bonded, and the park should review the warehouse's security procedures.

6. *What about delivery time?*

When the objects reach their destination, someone should be on site to receive them. Specify in the contract that the mover will schedule the arrival of the van at a time when the receiving facility is open or staffed.

7. *Where can I get help?*

- The Registrar's Committee and the Security Committee of the American Association of Museums (AAM) provide specialized publications and referrals. Call the AAM in Washington, D.C. (202-289-1818) for a contact.

I. Reporting and Recovering Stolen Museum Objects

Time is critical after a theft because after only a few hours the likelihood of recovery for most museum objects is very small. Success depends on:

- detecting the loss quickly
- notifying law enforcement agencies rapidly
- providing a detailed description of the objects and, if possible, a photograph

1. *What should I do if I suspect a theft?*

Before calling the police, make sure that a staff member has not moved the object to another location within the park. If you cannot locate the missing object within a reasonable time, call the park law enforcement specialist and the police.

- Secure the area and do not permit anyone to enter.
- Determine exactly what is missing, but do not handle or move anything, or allow anyone else to do so. Consider everything in the area of the theft as potential evidence.
- Locate the following records:
  - Museum Catalog Record (Form 10-254) for each missing object. Make photocopies for use during the investigation.
  - A clear photograph of the missing objects.
- The park's law enforcement officer must complete a Case Incident Record (Form 10-343), with a copy of each relevant museum catalog record attached to the report.

> ***See the NPS MH-II, Chapter 4, Inventory and Other Special Instructions, for guidance on reporting the loss of museum objects.***

2. *How do I report a theft to outside agencies?*

Theft of museum objects and library, archival and manuscript materials is a serious international problem, and only 10 to 15 percent of stolen museum objects are recovered. This is because it is difficult to alert law enforcement

agencies outside the area where the theft occurred about the theft. The problem is especially acute when the thief takes the stolen object over a state or international boundary, a common occurrence with stolen museum objects.

You should notify other appropriate agencies and offices as soon as possible after notifying local law enforcement authorities and the NPS law enforcement specialist. It is vital to report all losses, because the more widely a loss is reported, the better the chance of recovery.

Depending on your arrangements with the local police, they may be the conduit for reporting crimes to the Federal Bureau of Investigation (FBI) and to the International Police Organization (INTERPOL). See NPS *MH-II*, Chapter 4, Inventory and Other Special Instructions, Section III, for a list of agencies to which you can report a theft.

3. *How should I handle the news media after a theft?*

Dealing successfully with the news media can help limit the public relations impact of a theft.

- Detail **one** person as the media spokesperson and coordinate **all** communication with the news media through that person.
- Do not discuss details of the theft with the public, news media, or other employees.
- Do not speculate about what happened, what was stolen, or the value of the missing objects.
- Prepare a statement for the news media with general information about the incident, and release it as soon as practical.

J. Museum Collection Records

Museum records are as valuable as any object in the collection and should be just as well protected.

1. *Why are the records important?*

Records, catalogs, and photographs of the park's museum collection are vital for security of the collection. For example, stolen objects are more likely to be recovered if they have been cataloged and if a full description and even a photograph of the object is available for law enforcement agencies.

2. *When should I use the camera?*

Photographs are better for describing and identifying objects than written records.

- Photograph the museum collection, or at least the more valuable or sensitive objects.
- Photograph exhibits, both as a record of the exhibit and as a quick way to inventory objects on exhibit when opening and closing for the day. Consider keeping photographs in a three ring binder as a quick reference for interpreters. Some museums and historic sites keep catalog information about specific objects in the binder as well to help interpreters answer visitor questions about the history of the objects on

exhibit. See *MH-II*, Chapter 3: Cataloging, for procedures on cataloging, and Appendix K: Photography, for guidance on photographing museum objects.

3. *Should I review my museum records protection program?*

Yes. Records are vulnerable to a wide range of threats--human error, fire, theft, mildew, mold, pests, paper deterioration, water damage, disasters and electronic media deterioration--and require constant attention.

- Keep duplicates of all museum property records in a secure location off-site. Avoid a location that will be affected by an area-wide natural disaster, such as an earthquake, that would affect both the park and the off-site location.
- Restrict access. Catalog and accession records should not be accessible to visitors, researchers, or non-museum employees except under the close supervision of the curatorial staff. Theft of an object and its associated museum records makes it extremely difficult to trace the object or to prove its ownership.
- Check environmental conditions and make sure there is an active pest management program.
- Keep records away from pipes and out of basements or flood plains. Use water or leak detection alarms where water damage is a potential threat.
- Make sure records are included in disaster and recovery plans.
- Train personnel in proper record maintenance techniques, and check work for accuracy.
- Keep important records on high quality paper (high rag content with alkaline deterioration buffer).
- Make sure electronic media are backed-up, stored properly, and access is controlled.
- Store paper records in a locking, approved UL-Rated Class C or D, as appropriate) insulated filing cabinet.

4. *Where can I get help?*

Consult the following resources for additional information:

- For detailed descriptions and applications guidelines, see the *CRM Bulletin Supplement* by John E. Hunter cited in Section K.
- Your park's fire safety officer, a local fire marshal or an NPS archivist or collection manager.
- NPS *Tools of the Trade* for sources of approved insulated files.
- *MH-II*, Chapter 2: Accessioning, for guidance on protecting museum records.

K. World Wide Web Resources

College and Research Library News (C&RL News): <http://www.rbms.ne.edu/> Includes:
ACRL Standards for Ethical Conduct for Rare Book, Manuscript, and Special Collections Libraries and Librarians, with Guidelines for Institutional Practice in Support of the Standards.
ACRL/SAA Joint Statement on Access to Original Research Materials.
ACRL Guidelines for the Security of Rare Books, Manuscripts, and Other Special Collections.

Museum Security: <http://museum-security.org/>

Fire Safety: <http://www.nfpa.org/>

ExLibris (list serve). Send blank message without signature with the following in the subject line:
subscribe ExLibris Your Name to <listproc@library.berkeley.edu>

Archives (list serve). Send blank message without signature with the following in the subject line:
subscribe Archives Your Name to <listserv@miamiu.acs.muohio.edu>

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NFPA 25: *Inspection, Testing and Maintenance of Water-Based Fire Protection Systems*, 1998
NFPA 70: *National Electrical Code*, 1998
NFPA 72: *National Fire Alarm Code*, 1999
NFPA 110: *Emergency and Standby Power Systems*, 1993
NFPA 909: *Protection of Cultural Resources*, 2001
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M. Endnotes

1. NFPA 909: *Code for the Protection of Cultural Resources*. Quincy, MA: National Fire Protection Association, 2001, p.909-31, Table A.8.1, "Causes of Structural Fires in Museums or Art Galleries (1980-1997 Annual Averages)."

2. NFPA 909: *Code for the Protection of Cultural Resources*. Quincy, MA: National Fire Protection Association, 2001, Appendix A, A-8.1, p909-31.