

# ***Preservation Awareness Program Training Manual***



**for  
*The City of Aspen and Pitkin County***

**January 2000**



***Preservation Awareness  
Program  
Training Manual***

**for  
*The City of Aspen and Pitkin County***

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# Introduction

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The Preservation Awareness Program Training Manual is intended to enhance the knowledge-base of preservation and rehabilitation of historic buildings in the City of Aspen and Pitkin County. The information is primarily technical in nature and is based upon fundamental preservation philosophy and concepts of preservation design.

The information contained within this document is aimed to educate the professional building community, which includes contractors, tradespersons, planners, architects and developers. Additionally, the individual property owner can benefit from a better understanding of the philosophy of and technical procedures involved with historic rehabilitation.

## How Can the Aspen/Pitkin County Preservation Awareness Program be Used?

The program can be used to:

- Prepare building owners, architects, contractors and tradespeople for proper rehabilitation planning.
- Inform contractors of alternative technical options in the rehabilitation process.
- Enlighten historic building owners as to the standards they should expect from contracted tradespeople.
- Clarify specifications in building rehabilitation contracts.
- Direct building owners, architects and contractors to information resources that will help facilitate appropriate rehabilitation procedures.
- In addition, this is the primary document for the Aspen/Pitkin County Preservation Awareness Certification Exam required for construction on historic buildings. (see *Contractor Certification Procedures*)

- The technical information within this packet serves as a supplement to the principles and guidelines in the *Historic Preservation Guidelines for the City of Aspen*. (See *Associated Programs*)

## Organization of Information

This packet is divided into three sections: preservation philosophy, preservation standards and the treatment of historic building materials and elements.

Each section contains:

- a topical overview of the subject
- a list of *required* reading and/or viewing materials
- a list of *recommended* reading and/or viewing materials
- additional information resources

A listing of additional resources at the end of this document provides contacts for on-line resources, technical journals, professional organizations, and additional publications.

## Contractor Certification Procedure

The Aspen/Pitkin Community Development Department requires a certification process for individuals involved with construction on an historic building. This packet, the Aspen/Pitkin Preservation Awareness Program, is the primary educational source for the certification program.

The "Certification Exam" will be administered through the Community Development Building Division. All information included in the Certification Exam can be found either within this document, or in the "Required Readings" or "Required Viewing" materials listed at the end of most sections in this document.

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## Preparing for the Preservation Awareness Certification Exam

This document contains the fundamental information upon which the exam is based. In addition, throughout this document there will be areas at the bottom of the page that will direct the reader to either required or recommended reading and viewing materials.

The exam is solely based upon the information contained within this document as well as the required reading or viewing materials. The recommended materials are excellent supplements to further develop historic rehabilitation skills; however, they will not be included in the exam.

## Where to Find the Materials

All required materials and recommended materials are compiled in a collection called the "Historic Preservation Resource Library" located in the Historic Preservation Office at the Aspen City Hall and the Pitkin County Library. Many of the resources are library periodicals and are also available through organizations listed in the "Additional Resources" chapter of this document.

In addition, the Training Manual and required readings can be viewed on-line at [aspengov.com/departments/community\\_development/documents](http://aspengov.com/departments/community_development/documents) available.

## List of Required Readings

The following materials, in addition to this packet, are required study materials for the Aspen Preservation Awareness Certification Exam.

1. H. Thomas McGrath, Jr. "Qualification Standards for the Trades" in *Cultural Resource Magazine*. No. 12. 1997.
2. "Temporary Protection-Number 2", in Preservation Tech Notes. Washington D.C. Technical Preservation Services, National Park Service, U.S. Department of the Interior. pp. 1-8.
3. "Preservation Brief 6: Dangers of Abrasive Cleaning to Historic Buildings", Anne E. Grimmer. Washington D.C. Technical Preservation Services, National Park Service, U.S. Department of the Interior. 1979. pp. 1-8.
4. "Preservation Brief 2: Repointing Mortar Joints in Historic Masonry Buildings", Robert C. Mack and John P. Speweik. Washington D.C. Technical Preservation Services, National Park Service, U.S. Department of the Interior. 1999. pp. 1-16.

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### Required Reading or Viewing:

☞ Title of Reading Material(s)

*Location of reading or viewing material*

Example of "Required" materials, located at the bottom of many pages in this document.

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5. John Leeke. "New Life For An Early Doorway" in *Old-House Journal*. March/April 1993.
  6. "*Preservation Brief 9: The Repair of Historic Wooden Windows*". John H. Myers. Washington D.C. Technical Preservation Services, National Park Service, U.S. Department of the Interior. 1981. pp. 1-7.
  7. Steve Jordan. "Details that Endure" in *Old-House Journal*. May/June. 1999. pp. 46-49.
  8. "*Exterior Woodwork: Proper Painting and Surface Preparation*" in *Preservation Tech Notes*. Washington D.C. Technical Preservation Services, National Park Service, U.S. Department of the Interior. 1986. pp. 1-7
  9. "*Exterior Woodwork-Paint Removal from Wood Siding*" in *Preservation Tech Notes*. National Park Service, U.S. Department of the Interior. 1986.

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## ***Associated Programs***

The following is a list of programs and agencies referred to in this document:

- **Aspen Historic Preservation Commission.** This is a commission of Aspen citizens organized by the City of Aspen Preservation Planning office. They are responsible for reviewing design and project proposals involving historic buildings for the permit process.

- **Aspen Historical Society.** This is a private-non-profit organization that maintains records and artifacts of Aspen's history. They are a civic group and not a city department.

- **City of Aspen Historic Preservation Guidelines.** These guidelines provide the City of Aspen, through its Historic Preservation Commission (HPC), a basis for making informed, consistent decisions about proposed new construction and alterations to buildings and sites in the community for the formal permitting process.

- **Colorado State Historic Preservation Office.** This State office maintains the largest collection of historic information, photos, drawings, maps and records for the state of Colorado. In addition, it offers educational programs and technical assistance for historic research, preservation planning and technical assistance. A branch of this department administers the State Historical Fund, a funding assistance program for historic and preservation related projects.

- **National Park Service (NPS).** The National Park Service is administered through the United States Secretary of the Interior. It is the primary agency for establishing national standards and regulations affecting historic buildings and properties. The NPS offers educational programs, technical assistance and maintains the national archives for historic buildings and properties. The major sources of historic data are recorded in the Historic

American Building Survey (HABS) and the National Register of Historic Places. In addition the NPS has established the *Secretary of the Interior's Standards for the Rehabilitation of Historic Buildings*, which are the national preservation standards for historic buildings and used as determining factors for awarding federal income tax credits.

- **National Register Nominations.** The National Register of Historic Places is a list of sites and properties of historic significance that is maintained by the Secretary of the Interior. Properties listed on the register may have national significance, but they may also be listed if they are determined to have significance at a state or local level. The National Register is administered by the National Park Service and nominations are submitted through the State Historic Preservation Office in Denver, using criteria adopted by the Secretary of the Interior.

Income producing properties listed on the National Register may be eligible for federal income tax credit incentives. Designated properties are also protected from federally-funded projects which might harm or alter the historic character. Such federal projects must be reviewed for their potential negative impact. Alterations are not reviewed by the Park Service if the property owner is not seeking the federal income tax credits or if no federal actions are involved.

- **Historic Surveys.** These surveys can be conducted at the state or local level. They are detailed recordings of the built environment for the area being surveyed. Often these surveys are referred to as Historic Inventories. They are a record of individual buildings within a defined area, and document a buildings architectural characteristics, physical condition, and level of contribution to the surrounding historic context. These records usually can be found at the City Preservation Planning Office.

# 1. Preservation Philosophy

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## Why Preserve Historic Resources?

Across the nation, thousands of communities promote historic preservation because doing so contributes to neighborhood livability and quality of life, minimizes negative impacts on the environment, and yields economic rewards. Also, many property owners are drawn to historic resources because the quality of construction is typically quite high and the buildings are readily adaptable to contemporary needs. These same reasons apply in Aspen.

Preservation of the built environment in Aspen is a fundamental link to its past. Many of Aspen's buildings and homes are resources that tell the story of its heritage and unique historical development. Preserving these resources creates a sense of place for those who live in the community and orients visitors to Aspen's heritage.

### ***Construction quality***

Many of the historic structures in the city are of high quality construction. Other buildings were of more modest construction, but used lumber from mature trees that were properly seasoned and typically milled to "full dimension", which often yielded stronger framing. Masonry walls were carefully laid, resulting in buildings with considerable stability. Also, these structures were thoughtfully detailed and the finishes of materials, including fixtures, wood floors and trim, were generally of high quality, all features that owners today appreciate. By comparison, in today's new construction, materials of such quality are rarely available and comparable detailing is very expensive. The high quality of construction in historic buildings is therefore a "value" for many people.

### ***Adaptability***

Owners frequently find that the floor plans of historic buildings easily accommodate comfortable lifestyles and support a diversity of

populations. Many rooms are large, permitting a variety of uses while retaining the overall historic character of the structure. Historic buildings that are smaller in scale often have open lot space that can accommodate an addition, if needed.

### ***Livability and quality of life***

When groups of older buildings occur as a historic district, such as along Main Street in Aspen, they create a street scene that is "pedestrian friendly", and encourages walking and neighborly interaction. Mature trees, stone walls and decorative architectural features also contribute to a sense of identity that is unique for each historic neighborhood—an attribute that is rare and difficult to achieve in newer areas of a city. This physical sense of neighborhood can also reinforce desirable community social patterns and contribute to a sense of security. Many residents of historic districts, for example, note how easily they get to know their neighbors and praise the fact that they are recognized by others who live in the vicinity.

### ***Environmental benefits***

Preserving an historic structure is also sound environmental conservation policy because "recycling" the structure saves energy and reduces the need for producing new construction materials. Three types of energy savings occur:

- Energy is not consumed to demolish the existing building and dispose of the resulting debris.
- Energy is not used to create new building materials, transport them and assemble them on site.
- The "embodied" energy, that which was used to create the original building and its components, is preserved.

By "reusing" older buildings, pressure is also reduced to harvest new lumber and other materials that may have negative effects on the environment of other locales where the materials

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are produced. Because older buildings are often more energy-efficient than new buildings, when properly used, heating and cooling needs are reduced as well.

### ***Economic benefits***

Historic resources are finite and cannot be replaced, making them precious commodities that many buyers seek. Therefore, preservation adds value to private property. Many studies across the nation document that, where local historic districts are established, property values typically rise, or at least are stabilized. In this sense, designation of an historic district appears to help establish a climate for investment. Property owners within the district know that the time and money they spend on improving their properties will be matched with similar efforts on surrounding lots. Their investments will not be undermined by inappropriate construction next door.

The condition of neighboring properties also affects the value of one's own property: people invest in a neighborhood as much as in the individual structure itself. In historic districts where investment is attracted, property owners recognize that they each benefit from the commitment of their neighbors. An indication of the success of historic preservation is that due to local support the number of designated districts across the country has increased such that an estimated 1,000,000 properties, both as individual landmarks and in historic districts, are under local jurisdictions.

Preservation projects also contribute more to the local economy than do new building programs because each dollar spent on a preservation project has a higher percentage devoted to labor

and to purchase of materials available locally. By contrast, new construction typically has a higher percentage of each dollar spent devoted to materials that are produced outside of the local economy and to special construction skills that may be imported as well. Therefore, when money is spent on rehabilitating a building, it has a higher "multiplier effect," keeping more money circulating in the community.

Rehabilitating an historic building also can cost less than constructing a new building. In fact, the city's standards for rehabilitation of historic structures promote cost-saving measures: they encourage smaller and simpler solutions that in themselves provide savings. Preserving building elements that are in good repair is preferred, for example, rather than replacing them.

### ***Incentives for preservation***

While the economic benefits are substantial, special incentives also exist to help offset potential added costs of appropriate rehabilitation procedures. Income tax credits are offered at the state and federal levels for appropriate rehabilitation. In some cases, the city also can provide special zoning incentives and can help to expedite development reviews associated with preservation projects. Eligible projects can qualify for the Colorado Historical Society State Historical Fund, a substantial opportunity for owners of commercial and residential properties.

### ***Responsibility of ownership***

Ownership of an historic property carries both the benefits described above and a responsibility to respect the historic character of the property and its setting. While this responsibility does exist, it does not automatically translate into higher construction or maintenance costs. In the case of

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new construction, the Historic Preservation Guidelines for the City of Aspen are the appropriate source of information from which to plan a project that compliments existing historic buildings and houses.

Ultimately, residents and property owners should recognize that historic preservation is a long-range community policy that promotes economic well-being and overall livability of the city at large and that they play a vital role in helping to implement that policy through careful stewardship of the area's historic resources.

The following preservation principles should be applied to all historic properties in Aspen, in order to rehabilitate an historic building while retaining its defining characteristics and architectural integrity.



*The ornamentation within this original two-story bay window helps retain the integrity of the house.*

## **Basic Preservation Theory**

Preservation theory spans a wide range of influences and applications; however, it often includes the following concepts:

- Preservation is not freezing a building in time, but rather creating a sense of time and place with the built environment.
- Preservation encourages continued use of a building as long as it respects the historic character of the building.
- Preservation seeks to maintain the defining architectural characteristics from a buildings period of significance.
- Preservation encourages new construction that complements existing historic buildings, but stand as a representation of its own time.

## ***The Concept of Historic Significance***

What makes a property historically significant? In general, properties must be at least 30 years old before they can be evaluated for potential historic significance, although exceptions do exist when a more recent property clearly is significant. Historic properties must have qualities that give them significance. A property may be significant for one or more of the following reasons:

- Association with events that contributed to the broad patterns of history, the lives of significant people, or the understanding of Aspen's prehistory or history.
- Construction and design associated with distinctive characteristics of a building type, period, or construction method.
- Work by an architect or master craftsman or an expression of particularly high artistic values.
- Integrity of location, design, setting, materials, workmanship, feeling and association .

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## ***Period of Significance***

In most cases, a property is significant because it represents or is associated with a particular period in history. Frequently, this begins with the construction of the building and continues through the peak of its early occupancy. Building fabric and features that date from the period of significance typically contribute to the character of the structure.

For example:

- *An individual building*

Wheeler Opera House (built 1889)

Period of significance: approximately 1889-1930

- *A historic district*

Main Street miners cottages (built circa 1888)

Period of significance: approximately 1888-1930

## ***Concept of Integrity***

In addition to being historically significant, a property also must have integrity, in that a sufficient percentage of the structure must date from the period of significance. The majority of the building's structural system and materials should date from the period of significance and its character-defining features also should remain intact. These may include architectural details, such as dormers and porches, ornamental brackets and moldings, and materials, as well as the overall mass and form of the building. These elements help associate a building or district with a particular time in history.



*An appropriate adaptive reuse. This residential building has been converted to a commercial use with minimal exterior alterations.*

## **Alternative Approaches to Preservation**

Clarification of the design and rehabilitation approaches for a historic building promotes a more efficient project, unifies the construction elements, and enables all personnel to understand their tasks as common to a shared goal.

By combining an understanding of the history of the building, its present condition, and the need for actions that will lead into the future, one can then develop a preservation approach.

In doing so, consider the terms that follow:

### **Adaptive Use**

Converting a building to a new use that is different from that which its design reflects is considered to be "adaptive use." For example, converting a residential structure to offices is adaptive use. A good adaptive use project retains the historic character of the building while accommodating its new functions.

### **Maintenance**

Some work focuses on keeping the property in good working condition by repairing features as soon as deterioration becomes apparent, using procedures that retain the original character and finish of the features. In some cases, preventive maintenance is executed prior to noticeable deterioration. No alteration or reconstruction is involved. Such work is considered "maintenance". Property owners are strongly encouraged to maintain their properties in good condition so that more aggressive measures of rehabilitation, restoration or reconstruction are not needed.

### **Preservation**

The act or process of applying measures to sustain the existing form, integrity and material of a building or structure, and the existing form and vegetative cover of a site is defined as "preservation." It may include initial stabilization work, where necessary, as well as ongoing maintenance of the historic building materials. Essentially, the property is kept in its current good condition.

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## Rehabilitation

The process of returning a property to a state that makes a contemporary use possible while still preserving those portions or features of the property that are significant to its historic, architectural and cultural values. Rehabilitation may include the adaptive re-use of the building and major or minor additions may also occur. Most good preservation projects in Aspen may be considered rehabilitation projects.

## Renovation

To renovate means to improve by repair—to revive. In renovation, the usefulness and appearance of the building is enhanced. The basic character and significant details are respected and preserved, but some sympathetic alterations may also occur. Alterations that are made are generally reversible, should future owners wish to restore the building to its original design.

## Restoration

To restore, one reproduces the appearance of a building exactly as it looked at a particular moment in time. Restoration is to reproduce a pure style—either interior or exterior. This process may include the removal of later work or the replacement of missing historic features. A restoration approach is used on missing details or features of an historic building when the features are determined to be particularly significant to the character of the structure and when the original configuration is accurately documented

## Remodeling

To remake or to make over the design image of a building is to remodel it. The appearance is changed by removing original detail and by adding new features that are out of character with the original. Remodeling is inappropriate for historic buildings in Aspen.

## Combining Preservation Strategies

Many successful rehabilitation projects that involve historic structures in Aspen may include a combination of preservation, restoration, and other appropriate treatments. For example, a

house may be adapted for use as a restaurant, and in the process, missing porch brackets may be replicated in order to restore the original appearance, while existing original dormers may be preserved.



*This is an inappropriate remodel. The porch on this house has been removed and the original windows have been replaced with new windows that are out of scale.*



*This is an appropriate restoration. The porch and windows have been restored and kept intact.*

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## Preservation Principles

The following preservation principles should be applied to all historic properties in Aspen, in order to rehabilitate an historic building while retaining its defining characteristics and architectural integrity.

- **Respect the historic design character of the building.**

Don't try to change a building's style or make it look older than it really is. Confusing the character by mixing elements of different styles is also an example of disrespect.

- **Seek uses that are compatible with the historic character of the building.**

Building uses that are closely related to the building's original use are preferred. Every reasonable effort should be made to provide a compatible use for the building that will require minimal alteration to the building and its site. An example of an appropriate adaptive use is converting a residence into a bed and breakfast establishment. This can be accomplished without radical alteration of the original architecture.

Note that the Aspen Historic Preservation Commission (HPC) does not review uses; however, property owners should consider the impacts that some changes in use would have upon their historic properties, since this may affect design considerations that are reviewed by the HPC. These uses may aid in interpreting how the building was used historically. Check the zoning code to determine which uses are allowed.

When a more radical change in use is necessary to keep the building in active service, then those uses that require the least alteration to the building's significant elements are preferred. It

may be, that in order to adapt your building to the proposed new use, such radical alteration to its significant elements would be required that the entire concept is inappropriate. Experience has shown, however, that in most cases designs can be developed that respect the historic integrity of the building while also accommodating new functions. Note that more radical changes in use can make projects more expensive or result in the loss of significant features. Carefully evaluate the cost of alteration since adaptations for a radical change in use may prove too costly or destroy too many significant features.

- **Protect and maintain significant features and stylistic elements.**

Distinctive stylistic features or examples of skilled craftsmanship should be treated with sensitivity. The best preservation procedure is to maintain historic features from the outset so that intervention is not required. Protection includes the maintenance of historic material through treatments such as rust removal, caulking, limited paint removal and reapplication of paint.

- **Preserve any existing original site features or original building materials and features.**

Preserve original site features, such as grading, rock walls, etc. Avoid removing or altering original materials and features. Preserve original doors, windows, porches and other architectural features.

- **Repair deteriorated historic features, and replace only those elements that cannot be repaired.**

Upgrade existing material, using recognized preservation methods whenever possible. If disassembly is necessary for repair or restoration, use methods that minimize damage to original materials and replace the existing configuration.

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### For additional information:

Murtagh, William J. *Keeping Time: The History and Theory of Preservation in America*. Pittstown, New Jersey: The Main Street Press, 1988.

*Only available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)*

## 2. Planning a Historic Rehabilitation Project

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### Before You Start...

The following checklist suggests a typical process for documenting, evaluating and assessing an historic building prior to undertaking rehabilitation work. Proper research and planning will lead to a more efficient, cost-effective rehabilitation and help maintain the historic integrity of the building.

### *Research the Building's History*

Historical information often is available about the site that can help to determine how it looked originally, as well as cumulative changes that have occurred. This information may identify design alterations that have occurred and may help in developing an understanding of the significance of the building as a whole as well as its individual components.

Check available documentation at the following sources:

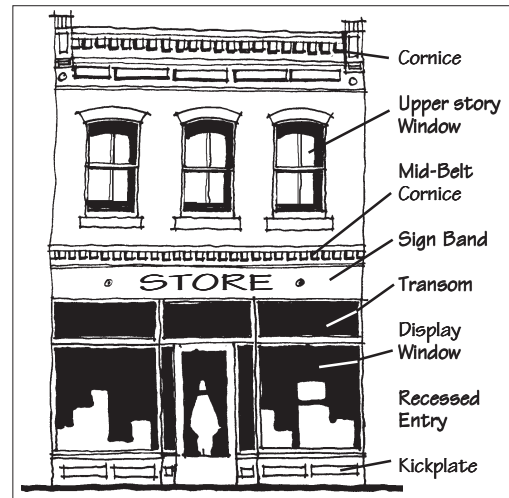
- State or local historical survey
- Historical documents, photos, archives
- Recordings by Historic American Buildings Survey (HABS)
- National Register nominations

### *Evaluate The Historic Character*

The character-defining features of a building that need to be identified and evaluated may include:

- The form and detailing on materials, such as wood, masonry and metal;
- Exterior features such as roofs, porches and windows;
- Interior materials, such as plaster and wood;
- Interior features such as moldings, stairways, and structural systems.

*Evaluation of the historic character of a commercial storefront might show the following:*



Additionally, architectural changes made over time should be evaluated. They may include:

- Additions such as a porch, wing, or upper story
- Changes to surfaces or finishes
- Altered window pattern
- Change to exterior details
- Changes to the basic plan, or the site

### *Assess Architectural Integrity & Physical Condition*

As an architectural system, has the building been assessed? The intactness of the building as a system determines its integrity, this includes its plan, features, materials, finishes and structural system. Answer the following questions:

- Are there physical problems that threaten the buildings architectural and structural integrity?

- Has a structural survey determined any deficiencies due to settlement, deflection of beams, altered structural members or acute damage?
- Is there inherent material damage, such as material failure due to poor design, poor quality materials, severe environmental damage, neglect or improper maintenance?
- Is there human-inflicted damage, such as removed or lost ornamentation, inappropriate coatings, or improper cleaning procedures?
- Are historic features hidden behind later alterations?
- Will the repairs solve the problem?

### ***List Requirements for Continued Use of the Building***

Answer the following questions:

- Is additional space needed?
- Should the work focus on preserving and maintaining the existing configuration?
- What are the code requirements and accessibility issues?

In summary, by combining an understanding of the history of the building, its present condition and the need for actions that will lead into the future, one can then develop a preservation approach.

*Remember that most buildings change over time. These changes may or may not be integral to the historic character of the building and should be evaluated carefully.*

## **Before Construction**

Any construction project requires careful planning, especially historic rehabilitation. It is important that all processes and procedures be planned in accordance with HPC standards. Failure to do so can lead to project delay and unplanned costs for all parties involved.

### ***Preliminary Research & Documentation***

- Research the buildings history and assess it for architectural integrity. (see page 11).
- Photograph both the interior and exterior of the building thoroughly to document existing conditions prior to any construction work. Note the location and date of photos.
- Plan for materials testing to determine the conditions of materials or systems. For example: paint finish analysis, mortar analysis, and masonry load capacities. This is generally performed by an architectural conservator or structural engineering firm that has experience with older buildings.

### ***Permits , Contracts and Plans***

Provide a copy of all plans and rehabilitation procedures to the HPC for review and approval.

- Obtain and post all required building permits on the site, including HPC conditions of approval.
- Provide all subcontractors with a copy of the plans approved by the HPC, along with the conditions of approval.
- Adapt conditions of approval and historic rehabilitation specifications to all contract specifications.

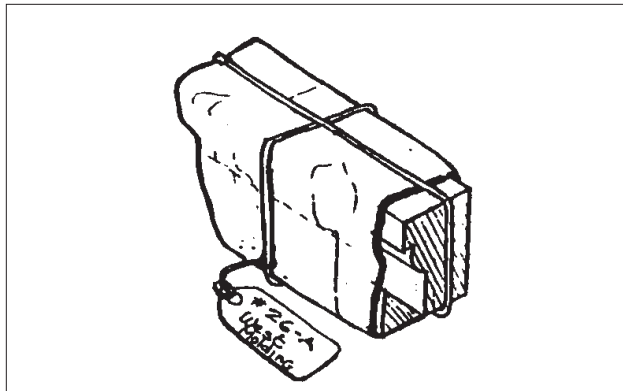
### ***Design***

- Evaluate whether options have been studied to achieve accessibility without destroying character-defining features.

- Determine whether work on the exterior and interior of the building has been planned to preserve distinctive historic fabric and historic character.

### **Personnel**

- If the project will require specialized crafts, such as stone carving or ornamental plastering, organize experienced professionals with the necessary expertise.
- Retain an architect or other qualified historic preservation consultant to be on-site during construction to ensure that work is carried out according to established preservation principles. This item shall be included in contract specifications.
- Construction personnel should be trained to understand the conditions of approved work and appropriately treat historic materials.



*Historic architectural detail marked and prepared for temporary storage.*

### **On-Site Procedures**

- Take measures to protect all historic fabric, as well as completed construction. (These procedures shall be included in the contract specifications.)
- Record, mark and store materials that must be removed from the building in such a manner that they are stored in a secure environment that will not cause any damage to the materials. In the future they can be reinstalled in an accurate, efficient manner.
- Propose all in-the-field changes to the HPC for review prior to actually commencing work. Failure to do so can lead to a stop-of-work order and/or financial penalties.

### **Protection of Site, Materials & Features**

Any construction project involves planned procedures to protect completed work and works-in-progress. Work on an historic building requires the same amount of care. In many cases, additional steps are needed to prevent the building, its features and the surrounding site from negative effects during the rehabilitation process.

In addition, it is essential that all contract material contain detailed information regarding protection for the building and the site. Responsibility for the protection procedures should be detailed for the architects, contractors and subcontractors.

Although general contract language may make reference to 'protecting existing construction' and may require that the contractor 'restore any damage to its original condition at no additional cost to the owner', in practice this general

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## **Required Reading:**

- ☞ "Temporary Protection-Number 2" Preservation Tech Notes, NPS. pp. 1-8.

*Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)*

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language provides little protection to existing historic features. At best, it only provides a payment mechanism after damage has occurred. This also perpetuates a situation whereby some contractors may elect to repair damage if it is perceived to be less expensive than protection procedures.

***For Example:***

During a rehabilitation project, portions of the roof are opened up and not thoroughly weatherproofed. Heavy storms may introduce water to the interior walls and ceilings. Hand-stenciled wall and ceiling finishes in a historic house will be destroyed. These elements are priceless and very difficult to restore. Establishing the cost of damage is difficult, because the historic character can not be replaced, regardless of the quality of replication work performed. It is better to prevent such a situation.

**Recommendations:**

The planning process should accommodate:

- Fire protection
- Protection of historic architectural features
- Protection of historic finishes
- Protection of all interior surfaces (this may apply even if the scope of work is primarily exterior)
- Protection of exterior surfaces (e.g. porch roofs, floors, stairs)

Protection methods should be planned and designed in such a way that they are durable for an extended period of time and do not damage any surfaces in their construction or attachment mechanisms. Documentation prior to commencement of work is critical to this process, as well as being a good preservation principle. The owner or contractor may want to document (either through photography or videotape) conditions to mediate any potential disputes over damage caused by construction versus pre-existing damage.

# 3. Qualification Standards for Building Tradespeople

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## Introduction

There is a growing movement within the preservation field to establish standards and proper training for tradespeople in order to assure that appropriate work is performed on historic buildings. This sentiment is increasingly being expressed at the national level through the National Park Service, local governments nationwide and grassroots trade organizations.

Currently the Secretary of the Interior has Historic Preservation Qualification Standards for thirteen professional fields related to historic preservation. These fields are all associated with an academic degree, and therefore are considered professional. These standards do not address the qualifications of the preservation technicians or preservation tradespeople who perform the work of applying the preservation treatments to historic buildings.

- Although many contractors are talented with modern building systems and techniques, the materials and procedures involved with historic rehabilitation are often unique and misunderstood. Skills in these historic trades are often difficult to acquire, but they are required to preserve and maintain historic buildings.
- Most building trade and apprentice programs focus upon current building practices and do not provide training for work on historic or older buildings.

## Why the Need For Preservation Training & Qualifications?

- Craftworker training is especially important considering that 85% of preservation maintenance projects in the United States are completed by contractors working directly with the building owners, without the input from knowledgeable architects or architectural conservators.
- Contractors need to be competent in making sophisticated on-the-spot decisions critical to the success of a preservation project.
- It is ultimately the handiwork of the craftsman that is seen at the completion of a rehabilitation project.

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## Required Reading:

☞ "Qualification Standards for the Trades" H. Thomas McGrath, Jr. in *Cultural Resource Magazine*.

Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)

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## **Benefits of Preservation Training & Qualification Standards**

Currently it can be difficult for tradespeople to acquire the necessary skills in order to work on historic buildings. There are significantly more educational programs oriented towards consultants and designers in the preservation field. This has created a situation where there are ample professionals to plan and specify fine restoration work, but a shortage of qualified workers to complete the restoration work.

For those willing to participate in a Preservation Awareness Program and Certification Program, this condition can be addressed.

By ensuring that skill, quality and experience, and not low cost and speed, are the factors that determine who in the preservation trades gets a job, it is easier to maintain a higher caliber workforce. If low cost and speed are the determining factors, then skilled craftspeople and preservation contractors cannot compete against unskilled contractors in the preservation field.

A system of qualification standards increases the public's ability to understand the skills required amongst tradespeople in the preservation industry.

## 4. Conservation of Historic Materials

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### Introduction

In Aspen, wood siding and brick were the typical primary exterior building materials. Stone and log were also used, but log frequently was clad with clapboard siding. Wood siding occurred in a variety of forms but painted, horizontal clapboard and novelty siding were the most popular. A variety of lap profiles were used.

In each case, the distinct characteristics of the primary building material (e.g. the scale of the material unit, its texture and finish) contribute to the historic character of a building. In a brick wall, for example, the particular size of brick used and the manner in which it was laid was distinct. In early masonry buildings, a soft mortar was used, which employed a high ratio of lime and little, if any, Portland cement. This soft mortar was laid in thin 'butter joints', and the inherent color of the material also was an important characteristic. The size of the bricks contributed to the sense of scale of the wall, as did the texture of the mortar joints. When repointing such walls, it is important to use a mortar mix that approximates the original. Many contemporary mortars are harder in composition than those used historically. These should not be used in mortar repairs because this stronger material is often more durable than the brick itself. As a result, the newer mortar is too strong for the older brick, causing it to break off during movement or swelling. When the wall shifts during normal changes in temperature, the brick units themselves can be damaged and spalling can occur.

The best way to preserve historic building materials is through well-planned maintenance. Wood surfaces should be protected with a good application of paint. Masonry should be kept dry by preventing leaks from the roof washing over the surface and by maintaining positive drainage away from foundations, such that ground moisture does not rise through the walls.

In some cases, historic building materials may be deteriorated. Horizontal surfaces such as chimneys, sills, and parapet copings are most likely to show the most deterioration because they are more exposed to weather and are more likely to hold water for longer periods, than vertical surfaces. When deterioration occurs, repair the material and any other related problems. Frequently, damaged materials can be patched or consolidated.

In other situations, however, some portions of the material may be beyond repair. In such a case, consider replacement. In the case of primary historic building materials, the new material should match the original. If wood siding had been used historically, for example, the replacement also should be wood. In the case of primary materials, replacement in kind is relatively easy because these materials are readily available and are of high quality.

It is important, however, that the extent of replacement materials be minimized, because the original materials contribute to the authenticity of the property as a historic resource. Even when

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### For additional information:

- ☞ Myers, John H., revised by Gary L. Hume, *Preservation Briefs 8: Aluminum and Vinyl Siding on Historic Buildings—The Appropriateness of Substitute Materials for Resurfacing Historic Wood Frame Buildings*. Washington, DC: Technical Preservation Services Division, National Park Service, U.S. Department of the Interior, 1984.
- ☞ Park, Sharon C., *Preservation Briefs 16: The Use of Substitute Materials on Historic Building Exteriors*. Washington, DC: Technical Preservation Services Division, National Park Service, U.S. Department of the Interior.

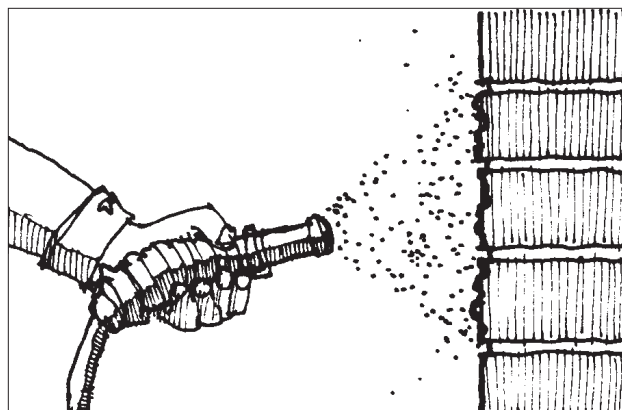
the replacement material exactly matches that of the original, the integrity of a historic building is to some extent compromised when extensive amounts are removed. This is because the original material exhibits a record of the labor and craftsmanship of an earlier time.

It is also important to recognize that all materials weather over time and that a scarred finish does not represent an inferior material, but simply reflects the age of the building. Preserving original materials that show signs of wear is therefore preferred to their replacement.

### ***Exterior Cleaning***

Sometimes the most well-intentioned actions can be the most detrimental to historic buildings. Although cleaning buildings should be a regular part of maintenance, this procedure is often excluded for long periods of time. The initial impulse in the rehabilitation process is often to remove decades and even centuries of accumulated soil. Appropriate rehabilitation procedures should aim to clean the building of all harmful soiling; however, they should NOT aim to create a new looking building. A limited amount of soiling tells the story of a building and creates a characteristic patina.

Abrasive cleaning methods are responsible for causing a great deal of harm to historic building materials. A thorough understanding of historic building materials and cleaning procedures is required to prevent irreversible aesthetic and physical damage to building features.



*Abrasive cleaning methods such as sandblasting, are in appropriate since they tend to erode surface materials and accelerate further deterioration in building materials.*

- All cleaning methods should be undertaken with the gentlest means possible.
- All cleaning methods should be researched and tested in areas representative of the targeted conditions. However, this should be done in an inconspicuous location. (e.g. lower brick courses in rear of house, NOT next to the front door).
- All tested procedures should only be evaluated after they have had ample time to demonstrate final results.
- Abrasive cleaning methods are a last resort, since they tend to erode surface materials and accelerate further deterioration in building materials.

*Note that all masonry material are unique and require individual treatment—for example, cleaning brick and granite require different procedures.*

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### **Required Reading:**

- ☞ "Preservation Brief 6: Dangers of Abrasive Cleaning to Historic Buildings" Anne E. Grimmer, NPS. pp. 1-8.

### **Recommended Reading:**

- ☞ "Preservation Brief 1: The Cleaning and Waterproof Coating of Masonry Buildings" Robert C. Mack, NPS. pp. 1-4.
- ☞ *Keeping it Clean: Removing Exterior Dirt, Paint, Stains and Graffiti from Historic Masonry Buildings.* Anne E. Grimmer. pp. 1-33. [Only available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)]

*Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)*

- **Gentler means of cleaning may include low-pressure water washes, or scrubbing areas with a natural bristle brush (never metal).**

Certain chemical cleaners with proper application can be effective; however, these should be evaluated only after representative test-patches have been performed in an appropriate location.

- **Often, a combination of procedures and materials is required to reach a desirable outcome while still using the gentlest means possible.**

There is no one formula that will be suitable for cleaning a building.

## Masonry Conservation

Masonry construction is one of the oldest and most enduring of construction types in Aspen. Its maintenance, preservation and rehabilitation also tends to be one of the most complex. Many of the traditional masonry skills have been lost in the trades, creating a problem in the rehabilitation process due to worker's unfamiliarity with materials and techniques. Modern scientific skills have proved useful; however, many have resulted in further damage.

The characteristics of a masonry wall are:

- Masonry type
- Bonding pattern
- Mortar type and profile
- Color
- Texture
- Detailing

Together these features create the unique characteristics of a wall, and all are equally important in the preservation of masonry aesthetics to maintain historic integrity.

It should be understood that if deterioration is minimal, it is preferable to leave the masonry alone, as long as the problem does not threaten the integrity of the building or detract too much from the architectural character.

*Note: Always address any structural issue prior to masonry treatment.*

*Note: All of the following methods require specialized technical expertise and should only be practiced after adequate testing by craftspeople familiar with historic masonry repair.*

## Common Problems, Causes & Solutions

### Chipping

Chipping is when small pieces of masonry separate from the main stone or brick.

Causes:

Later addition of too hard a mortar in nearby joints; accident.

Possible solutions:

- **Place a dutchman (a fill-in piece) of natural stone or a precast imitation for limited replacement.** This new unit should be carefully designed to meet all specifications in the General Principles for Masonry Conservation.
- **Patch selected areas of broken stone with epoxy.** This produces a thermosetting resin which makes a tough, hard coating with excellent adhesion.
- **Fill small areas of missing stone with composite patches.** Mixes vary according to type of masonry, but should always be weaker than the masonry and meet other specifications in General Principles for Masonry Conservation. Patches should match the original in color, texture and surface tooling.
- **Strengthen masonry with consolidation procedures.** This involves the application of an inorganic substance, chemically curable monomer or clear silicone polymer. Limited penetration of these consolidant methods provides only marginal long-term treatment.

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## Cracking

Cracking is narrow fissures from 1/16 inch to 1/2 inch wide in a block of masonry.

Causes:

Settling of a building; too hard a mortar; inherent characteristic of the masonry itself.

## Spalling and Exfoliation

Spalling is a condition when the outer layers begin to break off or peel away from larger blocks of masonry.

Causes:

The pressure of salts and freeze-thaw cycles of moisture trapped under the surface (subflorescence); too hard a mortar in repointing applications; improper cleaning techniques, especially abrasive methods, which may remove protective layers of brick or stone, thereby accelerating deterioration.

Possible solutions:

- **Determine the cause of the problem.** Eliminate the cause. For example: excess moisture in walls due to poor drainage, flashing failure, roof leaks, poor design.
- **Use water-repellent coatings in limited areas.** This may serve to slow down the rate of deterioration. This should only be employed after the surface has been thoroughly dried and measures have been taken to prevent water from reentering. This is a temporary solution. Waterproof coatings should never be applied to surfaces with evidence of subflorescence, since they will cause the mortar to retain the moisture and accelerate deterioration.
- **Fill small areas of missing stone with composite patches.** Mixes vary according to type of masonry, but they should always be weaker than the masonry and meet other specifications in *Guidelines for Masonry Rehabilitation*. Patches should match in color, texture and surface tooling.

- **Strengthen masonry with consolidation procedures.** This involves the application of an inorganic substance, chemically curable monomer or clear silicone polymer. Limited penetration of these consolidant methods provides only marginal long-term treatment.

## Rising Damp

Rising damp is the suction of ground water into the base of masonry walls through capillary action.

Causes:

Moisture is drawn up into the walls and released at the interior and exterior surfaces; the moisture often contains salts which can lead to further surface deterioration—often due to improper drainage.

Possible solutions:

- **Install a horizontal layer of material that is impervious to water.** This prevents the rising capillary action of ground moisture. First, all avenues should be explored to reduce ground moisture that may be caused by roof drainage, landscaping or grading problems.
- **Inject impervious materials into walls.** Because of the difficulty in inserting impervious layers into the walls of existing masonry, techniques have been developed to inject impervious chemical and synthetic materials. This process can also be helpful to minimize subflorescence.

## Weathering

Weathering is the natural disintegration or erosion of stone characterized by rounded surfaces. Weathering often occurs in areas of acid rain and is common to sandstones and limestones.

Causes:

Wind; rain; snow.

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## Mortar Failure

Mortar failure is the crumbling and deterioration of mortar strength, depth and profile.

Causes:

Naturally occurs with weathering; abrasive cleaning; chemical deterioration; excessive soiling.



*A porous sandstone cornice is prone to deterioration, which has accelerated mortar failure.*

## Repointing Mortar Joints

Repointing is the process of removing deteriorated mortar with hand tools and replacing the deteriorated mortar with new mortar. This is the most common masonry rehabilitation technique and should be thought of as regular long-term maintenance. In addition, this is frequently overlooked and performed with inappropriate materials and techniques which result in decreased aesthetics and accelerated masonry failure. Regular maintenance of roof materials, flashing, and damaged surfaces can prevent water infiltration and prevent mortar failure.

Using modern mortar between old bricks can be a recipe for disaster. Contemporary mortars are different in composition, strength, and color than historic mortars due primarily to the introduction of portland cement in the United States in the early 20th Century. Prior to the use of Portland cement in mortars, hydrated or slaked lime mixed

with sand was the primary mortar composition. This mortar was of a softer composition and served as a sacrificial layer, allowing for expansion in the masonry and adequate permeability to wick moisture from the masonry itself. The mortar joint in historic buildings was often considered the walls first line of defense.

The introduction of portland cement to older buildings has created a situation whereby the masonry itself becomes the sacrificial layer as moisture is trapped in the masonry, making it susceptible to expansion and freeze-thaw cycles. Any expansion is absorbed by the masonry itself, but often is unable to do so. This leads to failure in the form of cracking, spalling and exfoliation.

***Follow these steps:***

### ***Step 1. Identify the Historic Mortar Type***

If the building was built prior to 1900, it likely used a lime mortar. Those buildings built after 1900, need more careful examination to determine mortar composition. A sample test should be performed to determine mortar type.

The types of mortar include:

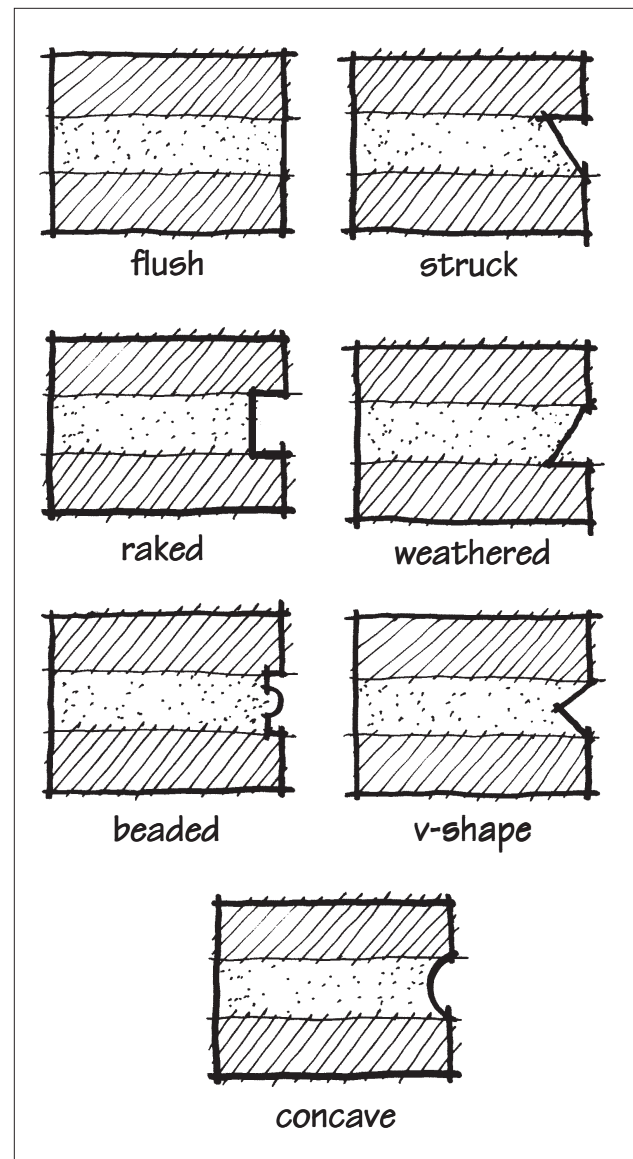
- *Lime Mortar*—generally has a pure white appearance (although white portland cement can be deceiving). Lime mortar will crumble under pressure between the fingers. Lime mortar will break down in a water or vinegar-and-lime solution.
- *Lime/Portland Cement Mix*—is a greyish color and will not crumble under hand pressure, but will crumble under a slight hammer tap. In a water-and-vinegar solution only a partial separation will occur. Remember: color alone is not an indicator, due to tinting agents which may have been added.
- *Portland Cement Mortar*—will break under a hammer, but tends to fracture and not crumble. It will not break down in a water-and-vinegar solution.

For conclusive results and accurate mortar reproduction, a sample mortar should be analyzed in a materials laboratory where it can be sampled for composition, aggregate mixture, bonding agents, porosity, color, and strength.

## Step 2. Reproduce Mortar

In creating a repointing mortar that is compatible with the masonry units, the objective is to achieve one that matches the historic mortar as closely as possible, so that the new material can coexist with the old. The following criteria are guidelines for proper mortar reproduction:

- The new mortar shall match the historic in color, texture and tooling—basic aesthetic components.
- The sand must match the sand in the historic mortar, since this will determine the mortar's color and texture.
- The new mortar must have greater vapor permeability and be softer in compressive strength than the masonry units.
- The new mortar must be as vapor permeable and as soft or softer in compressive strength than the historic mortar.



*Typical masonry joint types. When repointing masonry, the original joint design should be preserved.*

## Required Reading:

- ☞ "Preservation Brief 2- Repointing Mortar Joints in Historic Masonry Buildings" Robert C. Mack and John P. Speweik, NPS. pp. 1-16.

## Recommended Reading:

- ☞ "Repointing Right" in *Old-House Journal*. John P. Speweik, July/August 1997. pp. 46-51.

*Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall) and the Pitkin County Library*

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### **Step 3. Create Test Panels**

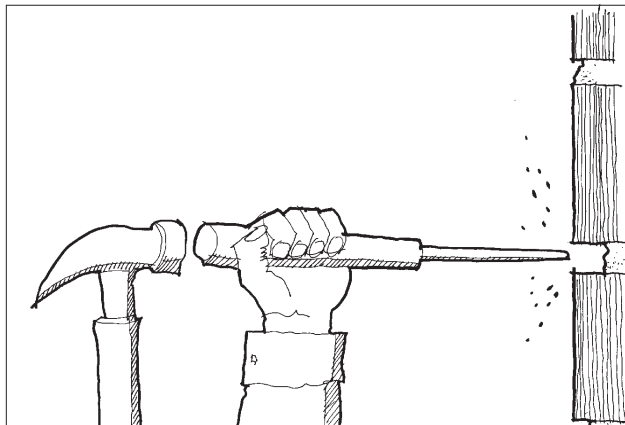
Creating test panels should follow the same procedures as outlined in the Cleaning section of this document, and generally should occur in the same location of the building. A general contractor may want to require test panels as part of the mason contractor selection process to determine the mason's ability to accurately reproduce historic mortars and detailing.

### **Step 4. Prepare the Joint**

The traditional manner of removing mortar is through the use of hand chisels. This provides the best final product due to minimal damage to the masonry units. The use of power saws and/or pneumatically-powered chisels should be avoided. Without careful use they will irreversibly damage the masonry units. Proficiency should be determined before these methods are approved.

### **Step 5. Fill the Joint**

Repointing shall maintain the same visual qualities as the historic pointing styles. Pointing styles may vary throughout a building. Wide joints that lap over the arris of the brick are indicators of poor workmanship and detract significantly from the rehabilitation.



*The traditional manner of removing mortar is through the use of hand chisels.*

## **General Principles for Masonry Conservation**

### **Protecting and Maintaining Masonry Appropriate**

- Identify, retain and preserve masonry features that are important in defining the overall historic character of the building (such as walls, brackets, railings, cornices, window surrounds, steps, columns) and details (such as tooling and bonding patterns, coatings and color).
- Protect and maintain masonry by providing proper drainage, do not allow water to stand on flat surfaces.

### **Inappropriate**

- Removing or radically changing masonry features which are important in defining the overall historic character of the building.
- Replacing or rebuilding a major portion of exterior masonry walls that could be repaired, so that the building is essentially new construction.
- Applying paint or other coatings to masonry that has been historically unpainted or uncoated.
- Removing paint from historically painted masonry.
- Failing to evaluate the causes of mortar joint deterioration such as leaking roofs, gutters, capillary action or extreme weather exposure.

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## **Cleaning Masonry**

### **Appropriate**

- Clean masonry only when necessary to remove heavy soiling.
- Carry out masonry cleaning processes after thorough testing has been performed to confirm long range results of the gentlest means possible.
- Clean masonry surfaces with the gentlest means possible such as with low pressure water and detergents, use natural bristle brushes.
- Remove damaged paint or deteriorated paint with the gentlest means possible (i.e. hand scraping).

### **Inappropriate**

- Cleaning masonry surfaces without sufficient testing or sufficient time to observe final results.
- Sandblasting brick or stone surfaces using dry or wet grit abrasives. This permanently erodes the surfaces and accelerates deterioration.
- Using cleaning methods that involve water or chemical solutions when there is a possibility of freezing temperatures.

- Cleaning with harsh chemical products that will damage masonry.
- Using high pressure water cleaning that will damage the mortar joints.
- Cleaning masonry surfaces when not heavily soiled to create a new appearance, needlessly introducing chemicals or moisture.
- Removing paint with potentially destructive methods such as sandblasting, caustic chemicals, or high-pressure water blasting.

## **Repointing Mortar Joints**

### **Appropriate**

- Repair masonry walls and features by repointing mortar joints where there is evidence of deterioration.
- Remove mortar by carefully hand raking joints.
- Duplicate old mortar in strength, composition, color and texture.
- Duplicate old mortar joints in width and profile.

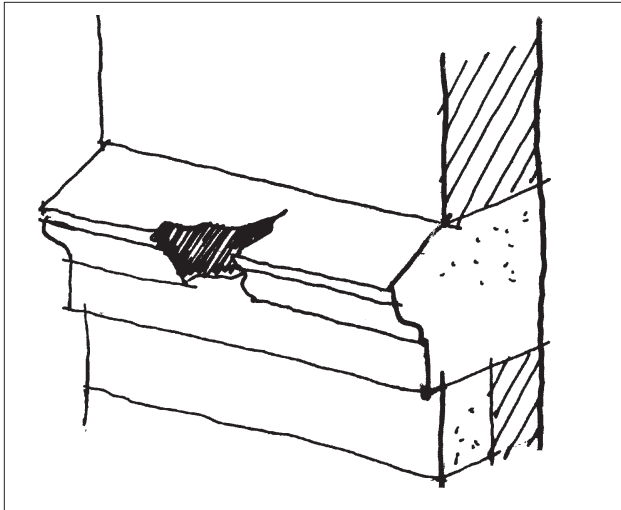
### **Inappropriate**

- Removing non-deteriorated mortar to create a uniform appearance with all new repointing.

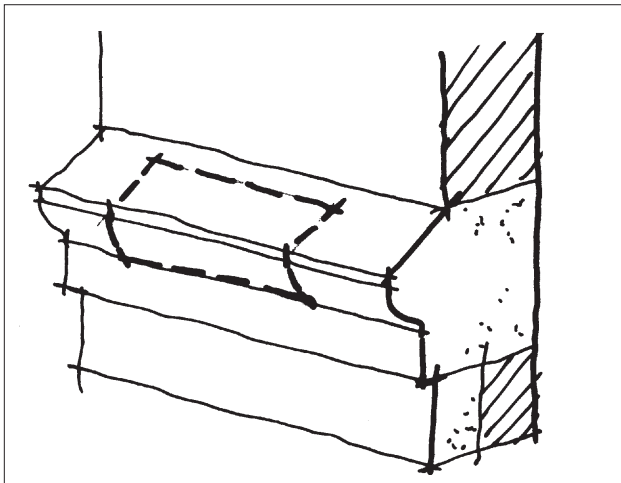
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## **For additional information:**

- ☞ Arndt, Jacob. "Seamless Stucco-Step-By-Step Repairs for Exterior Stucco" in *Old-House Journal*. July/August. 1995. pp. 48-53.
- ☞ Coney, William B. *Preservation Brief 15- Preservation of Historic Concrete: Problems and General Approaches*. Washington, DC: Technical Preservation Services Division, National Park Service, U.S. Department of the Interior. 1987.
- ☞ Grimmer, Anne E. *A Glossary of Historic Masonry Deterioration Problems and Preservation Treatments*. U.S. Department of the Interior, National Park Service, Heritage Preservation Services. 1997. [Only available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)]
- ☞ Levine, Jeffrey S. *Masonry-Stabilization and Repair of Historic Terra Cotta Cornice*. Preservation Tech Notes, U.S. Department of the Interior, National Park Service. 1991.
- ☞ New York Landmarks Conservancy. *Historic Building Facades-The Manual for Maintenance and Rehabilitation*. Preservation Press, New York, New York. pp. 31-136. ( Contains chapters on Stone Masonry, Brick Masonry, Terra Cotta Masonry, Cast Stone, Mortar, Concrete) [Only available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)]
- ☞ Powers, Robert M. *Masonry-Substitute Materials: Replacing Deteriorated Serpentine Stone with Pre Cast Concrete*. Preservation Tech Notes, U.S. Department of the Interior, National Park Service. 1988.



*If a cornice or other masonry feature is damaged or deteriorated, then repairing it is the preferred treatment.*



*Repair masonry features by patching, piecing-in, or consolidating the masonry using recognized preservation methods.*

- Repointing with mortar of high portland cement content, unless it is the content of the historic mortar. This is a common cause of accelerated deterioration due to differing expansion coefficients, porosity of the mortar and masonry material.
- Changing width or profile of repointing.

## **Repairing Masonry Features**

### **Appropriate**

- Repair masonry features by patching, piecing-in, or consolidating the masonry using recognized preservation methods, after addressing the cause of the deterioration. Repair may include the limited use of compatible substitute materials.
- Replace missing historic features with accurate restoration using adequate historical documentation or a new design that is compatible in size, scale, material, and color.

### **Inappropriate**

- Replacing entire masonry features when only portions require repair.
- Using substitute materials that do not convey the visual appearance of the surviving parts, or that are physically or chemically incompatible.
- Creating a false historical appearance based on insufficient information, or introducing a new feature that is incompatible in size, scale, material or color.

## Wood Conservation

Historically, wood was one of the most frequently used construction materials. Many of the historic residences and commercial facades in Aspen were constructed with high quality wood, often employing enduring joinery and high quality craftsmanship. Wood provided an excellent medium for carpenters to express their talents and creativity. Preserving these features is fundamental to retaining the historic character of the commercial and residential districts and landmarks in and around Aspen.

### ***Evaluation and Analysis of Wood Conservation Problems***

#### **Coating Failure**

Coating failure is one of the most common problems leading to wood deterioration. Often coating failure is a result of moisture problems, or incompatible layers of finish coats. Any signs of coating failure should be signals of likely wood deterioration and the need to assess moisture problems.

#### **Decay**

Decay is usually in the form of brown rot or white rot. Excess moisture in the wood fosters an environment for fungi, the cause of decay.

#### **Failure of Fastenings**

Failure of fastenings occurs when ferrous metals rust extensively and are no longer able to support the required load.

#### **Checking, Splitting and Sheared Members**

Wood will naturally check over time, particularly when drying. Rapid drying can promote excessive checking and diminish the structural integrity of members. In older buildings, excessive stresses have often been placed upon timbers due to later structural alterations. Excessive forces for an extended time can shear structural members.

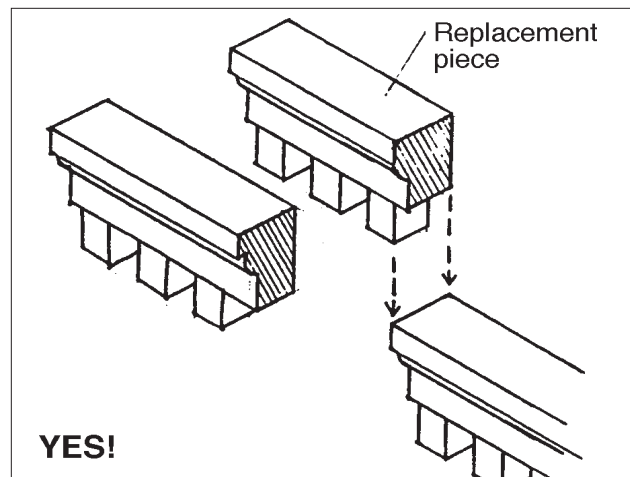
*Note: Always investigate why a coating has failed and address the causes prior to applying new finishes.*

#### **Insect Infestation**

Insect infestation poses significant danger to historic wood buildings because by the time signs are apparent, considerable damage has already been done. The following evidence may indicate insect infestation: bore dust, excretia, debris and tunnels. Often the interior of the member contains the most damage and the exterior can be deceptively fine.

#### **Technical Options**

Appropriate options should be chosen to conserve wood features in historic building to meet the Guidelines and Principles outlined on the previous pages. Too often wood features are removed in haste and replaced with inappropriate substitutes. Increased familiarity with the technical options available (from simple detail repair to complex structural member repair) promotes higher quality rehabilitation by retaining original building fabric.



*Replace details in-kind with wood of similar characteristics.*

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## Structural Repair

- **Reinforce wood members** with dowels or pegs of wood, metal or fiberglass. Timbers can be splinted with new timbers, structural steel and screwing. Tenons can be replaced and severely checked timber can be stabilized.
- Fill missing areas with a variety of methods including: wood splicing, synthetic resins and wood dust and commercial epoxy fillers.
- **Strengthen old wood** after fungal or insect attack by impregnating the wood with a low viscosity synthetic resin—referred to as consolidation.
- Combine systems of reinforcement and consolidation in order to enable old timbers to retain their aesthetic quality, while carrying loads again.

## Repair of exterior features and details

- Many of the same techniques used for structural repairs are appropriate for the exterior repair of wood features.
- **Replace details in-kind** with wood of similar characteristics.
- **Consider substitute materials** when the original is not available, or where the original is known to be susceptible to decay or where maintenance may be difficult (such as on a church steeple).
- **Consider substitute material only** if it is

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## Basics of Wood Conservation

- ☞ Remove the source(s) causing the deterioration. Examples include a leaking roof, failed gutters, poor interior ventilation, overloading.
- ☞ Make all efforts to retain original work and disturb it as little as possible.
- ☞ Repair it in such a manner that the original aesthetic effect is not impaired.
- ☞ Pay attention to the effect of heavy exterior work upon the interior of a building.
- ☞ Avoid altering the balance of stresses without careful structural engineering.
- ☞ Approach straightening of structures carefully, and consider merely securing and stabilizing.
- ☞ Investigate all options to repair wood features prior to replacement.
- ☞ Partial or complete replacement should be in-kind and match the existing feature in the following criteria: species, cut type, color, tooling, finish.

similar in composition, design, color, and texture to the original.

- **Take proper care in the removal** of features during construction to avoid any damage.
- **Evaluate materials for their long-term durability.** For example-stainless steel fasteners, high quality caulking compounds, back priming boards and details, decay resistant woods and quality joinery.

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## Recommended Reading:

☞ "Techniques for Two Timbers" John Leeke in *Old-House Journal*. September/October 1996.

Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall) and the Pitkin County Library.

☞ "Exterior Woodwork- Protecting Woodwork Against Decay Using Borate Preservatives" in Preservation Tech Notes. NPS. 1993.

Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)

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## Model Rehabilitation Project

- The referenced article, "New Life for an Early Doorway" is an example of appropriate planning, procedures, techniques and attention to quality craftsmanship when rehabilitating wood features on an historic building.

### Note the appropriate rehabilitation approaches profiled in the article:

- Approaches to retain as much of the original materials as possible
- Creation of new parts based upon methodically researched designs
- Careful testing of techniques and materials prior to final application

### Note the appropriate rehabilitation techniques profiled in the article:

- Careful removal of parts to repair and replace
- Use of durable materials in reconstruction
- Conservation of existing wood through consolidation/epoxy treatment
- Use of historic materials
- Back priming all members
- The use of hand tools for careful replication of details
- Thorough finish analysis and careful sample testing for paint removal

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## Required Reading:

☞ "New Life For An Early Doorway" by John Leeke in *Old-House Journal*. March/April 1993.

Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall) and the Pitkin County Library.

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## Additional Information:

☞ Bock, Gordon. "The Craft of Clapboarding" in *Old-House Journal*. May/June 1999

☞ Leeke, John. "Curing Ailing Sills" in *Old-House Journal*. March/April 1994.

☞ O. Bright, Alan. *Exterior Woodwork-Paint Removal from Wood Siding*. Preservation Tech Notes, U.S. Department of the Interior, National Park Services. 1986.

☞ Park, Sharon. *Exterior Woodwork-Proper Painting and Surface Preparation*. Preservation Tech Notes, U.S. Department of the Interior, National Park Services. 1986.

☞ Weaver, Martin. *Conserving Buildings-A Manual of Techniques and Materials*. "Restoring and Repairing Old Wooden Structures" Preservation Press. New York, New York. 1997. pp. 13-57. [Only available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)]

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## General Principles for Wood Conservation

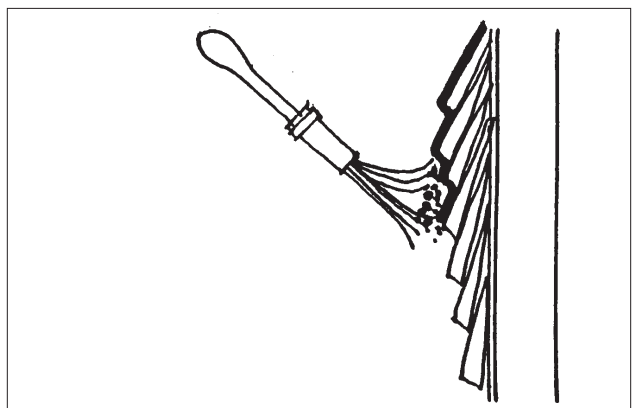
### ***Retain and Preserve Wood Features***

#### **Appropriate**

- Identify, retain and preserve wood features that are important in defining the overall historic character of the building such as: siding, cornices, brackets, window surrounds, doorway surrounds, and their paints and finishes.

#### **Inappropriate**

- Removing or radically altering wood features that are important in defining the overall historic character of the building.
- Removing a major portion of the historic wood feature instead of repairing or replacing only the deteriorated wood feature.
- Radically changing the historic type of finish, its color or accent scheme so that the historic character of the exterior is diminished.
- Stripping historic surfaces to bare wood, then applying clear finishes to create a 'natural' look.



*Inspect wood surfaces to determine if painting or cleaning is all that is required.*

### ***Protect Wood Features***

#### **Appropriate**

- Protect and maintain wood features by maintaining proper drainage so that water does not stand on flat surfaces.
- Inspect wood surfaces to determine if painting or cleaning is all that is required.

#### **Inappropriate**

- Failing to identify the causes of wood deterioration prior to cosmetic treatments.

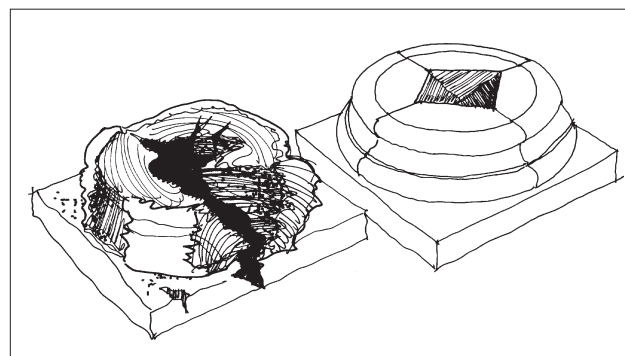
### ***Remove Paint***

#### **Appropriate**

- Remove paint to the next sound layer using the gentlest means possible, then repaint.
- Use chemical strippers to supplement other methods of paint removal. Detachable wood elements can be chemically dip-stripped.

#### **Inappropriate**

- Removing paint that is firmly adhering to, thus protecting wood surfaces.
- Using destructive paint removal methods such as open flame, sandblasting or waterblasting. These can irreversibly damage historic woodwork.
- Failing to neutralize the wood thoroughly after using chemical strippers.
- Allowing chemical strippers to raise the grain surface features.



*Replace in-kind an entire wood feature that is too deteriorated to repair. If the overall form and detailing are still evident, use the physical evidence to reproduce the feature.*



Where a historic element or detail is missing it should be replaced.



Design and install a new one based upon accurate restoration using historical research.



Where no historic evidence is available, a new design that is compatible in size, scale, material and color of the historic building is appropriate.

## Repair Wood Features

### Appropriate

- Repair wood features by patching, piecing-in, consolidating or otherwise reinforcing the wood with proven preservation methods. Repair may also include limited replacement in-kind, or with compatible substitute materials.
- Replace in-kind an entire wood feature that is too deteriorated to repair, if the overall form and detailing are still evident, using the physical evidence to reproduce the feature. If using the same material is not technically or economically feasible, then a compatible substitute material may be considered.
- Design and install missing historic features based upon accurate restoration using historical research or a new design that is compatible in size, scale, material and color of the historic building.

### Inappropriate

- Replacing an entire wood feature such as a cornice or wall when repair or limited replacement is inappropriate.
- Removing an entire wood feature and not replacing it, or replacing it with a new feature that does not convey the same visual appearance.
- Creating a false historical appearance because the replaced feature is based upon insufficient historical documentation, or creating a new appearance that is incompatible in size, scale, material or color.

For additional information see *Preservation Treatments* section(s):

- *Historic Finishes*

## 5. Window Conservation

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### ***Principle:***

The character-defining features of historic windows and their distinct arrangement should be preserved. In addition, new windows should be in character with the historic building. This is especially important on primary facades.

### **Introduction**

Windows are some of the most important character-defining features of historic structures. They give scale to buildings and provide visual interest to the composition of individual facades. Distinct window designs help define many historic building styles. Windows often are set into relatively deep openings or they have surrounding casings and sash components which have a substantial dimension that cast shadows that contribute to the character of the historic style. Because windows so significantly affect the character of a historic structure, the treatment of a historic window and the design of a new one are therefore very important considerations.

### **Window Features**

The size, shape and proportions of an historic window are among its essential features. Many early residential windows in Aspen were vertically proportioned. Another important feature is the number of lights or panes, into which a window is divided. Typical windows for many late nineteenth century cottages were of a "one-over-one" type, in which one large pane of glass was hung above another single pane. The design of surrounding window casings, the depth and profile of window sash elements and the materials of which they were constructed are also important features. Most early windows were made of wood although some historic metal casement windows are found. In either case, the elements themselves had distinct dimensions, profiles and finishes.



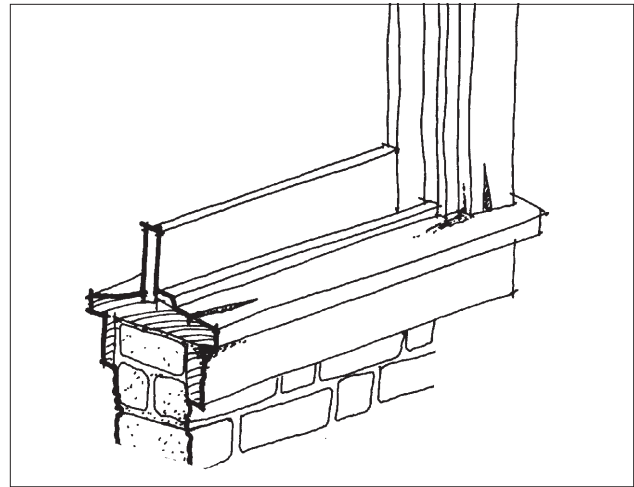
*Ornamental windows such as those above are character-defining features that often indicate the architectural style of a house.*

The manner in which windows are combined or arranged on a building face also may be distinctly associated with a building style. For example, on some bungalows a large central pane of fixed glass was flanked by a pair of vertically-proportioned casement windows. This compound window frequently occurred on building fronts under broad porches. All of these features are elements of historic window designs that should be preserved.

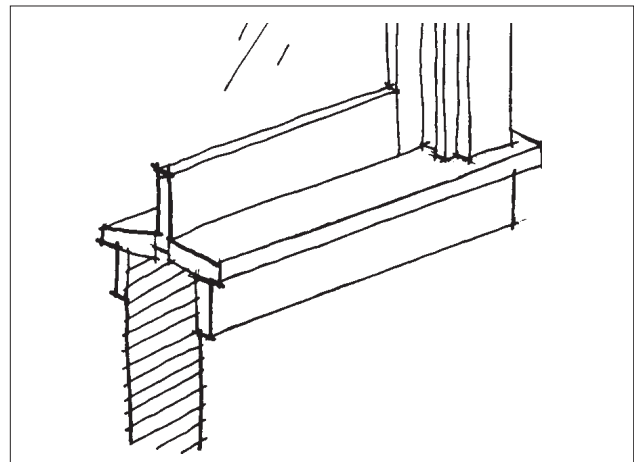
## Deterioration of Historic Windows

Properly maintained, original windows will provide excellent service for years to come. Most problems that occur result from a lack of maintenance. For example, the accumulation of layers of paint on a wood sash may make operation difficult. Using proper painting techniques, such as removing upper paint layers and preparing a proper substrate, can solve this problem.

Water damage and the ultra violet degradation caused by sunlight also are major concerns. If surfaces fail to drain properly, water may be introduced. Condensation during winter months also can cause problems. Damage occurs when the painted layer is cracked or peeling. Decay results that may make operation of the window difficult and if left untreated can result in



*Historic window, with deteriorated sill and jamb, before rehabilitation.*



*The historic window repaired to its original condition helps retain its historic significance.*

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## Required Reading:

☞ *Preservation Brief 9: The Repair of Historic Wooden Windows*. John H. Myers. NPS. 1981 pp. 1-7.

*Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)*

## Recommended Reading:

☞ Leeke, John. "Curing Ailing Sills" in *Old-House Journal*. March/April 1994.

*Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall) and the Pitkin County Library*

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***Whenever possible, repair a historic window, rather than replace it.***

significant deterioration of window components. In most cases, windows are not susceptible to damage if a good coat of paint is maintained.

## **Repair of Historic Windows**

In most cases it is in fact easier and more economical to repair an existing window rather than to replace it, because the original materials contribute to the historic character of the building. Even when replaced with an exact duplicate window, a portion of the historic building fabric is lost and therefore such treatment should be avoided. When considering whether to repair or replace a historic window, consider the following:

***Follow these steps:***

### ***Step 1. Determine the window's architectural significance.***

Is it a key character-defining element of the building? Typically, windows on the front of the building and on sides designed to be visible from the street, are key character-defining elements. A window in an obscure location or on the rear of a structure may not be. Greater flexibility in the treatment or replacement of such secondary windows may be considered.

### ***Step 2. Inspect the window to determine its condition.***

Distinguish superficial signs of deterioration from actual failure of window components. Peeling paint and dried wood, for example, are serious problems, but often do not indicate that a window is beyond repair. What constitutes a deteriorated window? A rotted sill may dictate its replacement, but it does not indicate the need for an entirely new window. Determining window condition must occur on a case-by-case basis. However, as a general rule, a window merits preservation with

perhaps selective replacement of components, when more than 50 percent of the window components can be repaired.

### ***Step 3. Determine the appropriate treatment for the window.***

Surfaces may require cleaning and patching. Some components may be deteriorated beyond repair. Patching and splicing-in new material for only those portions that are decayed should be considered in such a case, rather than replacing the entire window. If the entire window must be replaced, the new one should match the original in appearance. (See "Replacement Windows" in the following section.)

## **Energy Conservation**

In some cases, owners may be concerned that an older window is less efficient in terms of energy conservation. In fact, most heat loss is associated with air leakage through gaps in an older window that are the result of a lack of maintenance, rather than loss of energy through the single pane of glass found in historic windows. The glazing compound may be cracked or missing, allowing air to move around the glass. Sash members also may have shifted, leaving a gap for heat loss.



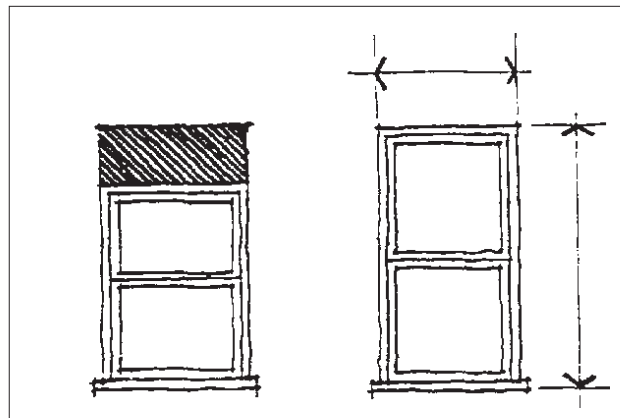
*If a storm window is to be installed on the exterior, match the sash of the original window.*

The most cost-effective energy conservation measures for most historic windows are to replace the glazing compound, repair wood members and install weather stripping. These steps will dramatically reduce heat loss while preserving historic features.

If additional energy savings are a concern, consider installing a storm window. This may be applied to the interior or the exterior of the window. It should be designed to match the historic window divisions such that the exterior appearance of the original window is not obscured.

## Replacement Windows

While replacing an entire window assembly is discouraged, it may be necessary in some cases. When a window is to be replaced, the new one should match the appearance of the original to the greatest extent possible. To do so, the size and proportion of window elements, including glass and sash components, should match the original. In most cases, the original profile, or outline of the sash components, should be the same as the original. At a minimum, the replacement components should match the original in dimension and profile and the original depth of the window opening should be maintained.



A replacement window shall match the original in its design. The new window (on the left) is smaller than the historic opening and is inappropriate.

### **Step 1. Replace a window to match the appearance of the original to the greatest extent possible.**

While replacing an entire window assembly is discouraged, it may be necessary in some cases. To do so, the size and proportion of window elements, including glass and sash components, should match the original. In most cases, the original profile, or outline of the sash components, should be the same as the original. At a minimum, the replacement components should match the original in dimension and profile, and the original depth of the window opening should be maintained.

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For additional information:

- ☞ Park, Sharon C. *Preservation Briefs 13: The Repair and Thermal Upgrading of Historic Steel Windows*. Washington, DC: Technical Preservation Services, National Park Service, U.S. Department of the Interior.
- ☞ New York Landmarks Conservancy. *Repairing Old and Historic Windows: A Manual for Architects and Homeowners*. Washington, DC: National Trust for Historic Preservation, 1992. [Only available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)]
- ☞ National Trust for Historic Preservation. *New Energy for Old Buildings*. Washington, DC: The Preservation Press, National Trust for Historic Preservation, 1981. [Only available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)]
- ☞ *The Old House Journal*. "Anatomy of a Double-hung Window."

**Step 2. Use the same material as the original window.**

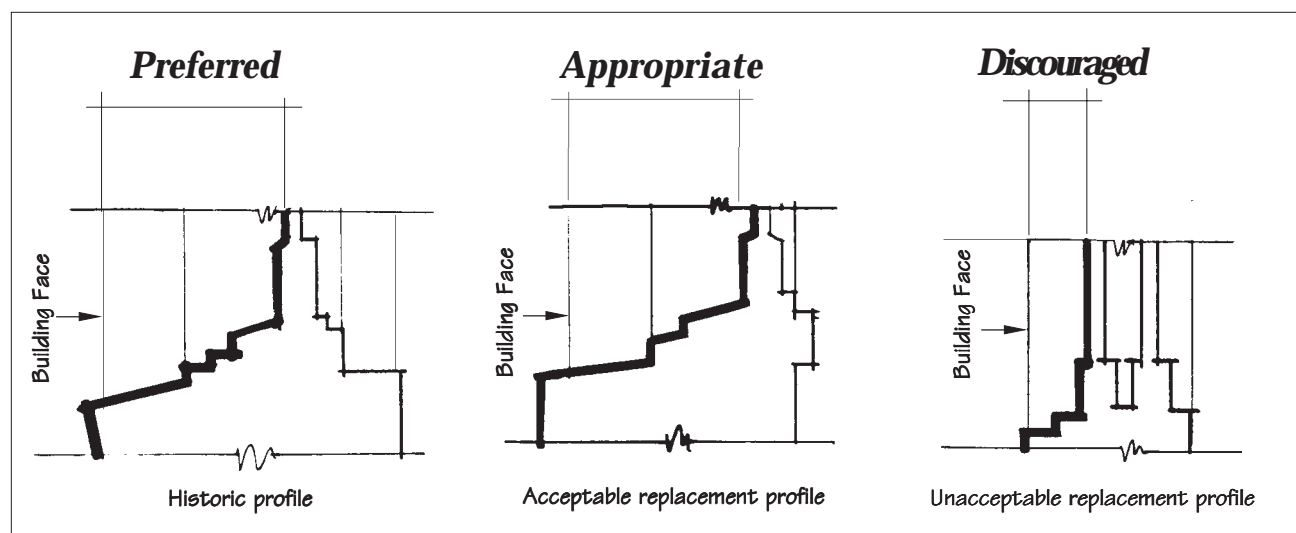
A frequent concern is the material of the replacement window. While wood was most often used historically, metal and vinyl-clad windows are common on the market today and sometimes are suggested as replacement options by window suppliers. If the historic window was wood, then using a wood replacement is the best approach.

**Step 3. Match alternative materials to the original, in terms of the finish of the material, its proportions and profile of sash members.**

It is possible to consider alternative materials in some special cases, if the resulting appearance will match the original. For example, if a metal window is to be used as a substitute for a wood one, the sash components should be similar in size and design to those of the original. The substitute material also should have a demonstrated durability in similar applications in this climate.

**Step 4. Preserve the original casing when feasible.**

This trim element often conveys distinctive stylistic features associated with the historic building style and may be costly to reproduce. Many good window manufacturers today provide replacement windows that will fit exactly within historic window casings.



When replacing a historic window, match, as closely as possible, the profile of the sash and its components to that of the original window.



## 6. Porch Conservation

### ***Principle:***

Where a porch has been a primary character-defining feature of a front facade, this should continue. In addition, a new (replacement) porch should be in character with the historic building, in terms of scale, materials and detailing.

### **Introduction**

Historically porches were popular features in residential design. From the period of the Classical Revival of the nineteenth century to the Craftsman and Period Revivals of the early and middle twentieth century, architects have integrated porches into their buildings. A porch protects an entrance from snow and provides shade in the summer. It also provides a sense of scale and aesthetic quality to the facade of a building. A porch catches breezes in the warmer months, while providing a space for residents to sit and congregate. Finally, a porch often connects a house to its context by orienting the entrance to the street.

Many architectural styles and building types developed with the porch as a prime feature of the front facade. Some porches even convey the design expression of the house, such as the Prairie style porch, which often echoes the horizontal orientation of the house. Because of their historical



*Historically porches were popular features in residential design. This porch connects its house to its context and helps to identify its architectural style.*

importance and prominence as character-defining features, porches should receive sensitive treatment during exterior rehabilitation and restoration work.

### **Porch Features**

Porches vary as much as architectural styles. They differ in height, scale, location, materials and articulation. Porches may be simple one- or two-story structures. A porch may project or wrap and have elaborate details and finishes. Although they vary in character, most porches have a few elements in common:

- Balustrades
- Posts/columns
- Architectural details
- Hipped/shed roofs



*This porch has been altered. As a result, its historic character is compromised.*

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These elements often correspond to the architectural style of the house and therefore the buildings design character should be considered before any major rehabilitation or restoration work is done.

## Porch Deterioration

Because of constant exposure to sun and rain and the fact that a porch is open to the elements, it decays faster than other portions of a house. Much deterioration is caused by rain spilling onto the porch from the main roof of the house. If this water does not drain away, then deterioration occurs. Furthermore, if the water is not then channeled away from the foundation of the porch its footings may be damaged. One type of damage is rising damp—a condition in which masonry absorbs water from the ground up, and begins to decay. Other problems include weathering of features such as posts, columns, steps and decorative detailing. Peeling paint is a common symptom. In some cases the porch itself may experience sagging or detachment from the house due to settling of the house or the porch.

## Porch Alterations

Many porches have been altered or removed through time. Some have had minor changes, such as roof repairs or repainting, while others have been altered to the degree that they have lost much of their character. In many cases a porch may have lost character-defining features, such as balustrades, posts, columns and decorative brackets—features that usually define architectural styles and that may have been replaced by incompatible substitutes. For instance, wood columns and balustrades were commonly replaced with thin wrought iron railings and posts in the 1950s. This compromised the proportions and architectural integrity of the house. In the mid-twentieth century it was also fashionable to totally remove the front porch. Since the 1950s, it has also been popular to enclose a front porch with opaque materials, which destroys its historic character and function.



*Because of constant exposure to sun and rain and the fact that a porch is open to the elements, it decays faster than other portions of a house.*



*It is preferred to repair any deteriorated portions of a porch, rather than replacing the porch altogether.*

## Repair of Porches

After discovering structural or cosmetic problems with a porch, one should begin to formulate a strategy for its treatment. The most sensitive strategy is to repair the porch. This treatment is

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preferred, rather than replacing the porch altogether. In most cases it is in fact easier, and more economical, to repair an existing porch or porch elements, rather than to replace them. This approach is preferred because the original materials of a porch contribute to the historic character of the building. Even when replaced with an exact duplicate porch, a portion of the historic building fabric is lost. Therefore, such treatment should be avoided whenever possible.

## Replacing a Porch

*Follow these steps:*

***Step 1. Investigate the status of the current porch to determine its history, as well as to ascertain which features, if any, are original.***

While replacing an entire porch is discouraged, it may be necessary in some cases.

***Step 2. Research the history of the house to determine the appearance and materials of the original porch.***

In doing so, one should search for: 1) written documentation of the original porch in the form of historic photographs, sketches and/or house plans; 2) physical evidence of the original porch,



*Wood detailing on porches, such as this jigsaw ornamentation, should be preserved.*

including ghost lines on walls that indicate the outline of the porch and/or holes on the exterior wall that indicate where the porch may have been attached to the front facade; 3) examples of other houses of the same period and style that may provide clues about the design and location of the original porch.

***Step 3. Respect the location, scale, and materials of the replacement porch.***

***Step 4. Design new details that are compatible with the design of the porch and the style of the house.***

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## Required Reading:

☞ Steve Jordan. "Details that Endure" in *Old-House Journal*. May/June 1999. pp. 46-49.

## Recommended Reading:

☞ Mary Ellen Polson. "A Place for the Porch" in *Old-House Journal*. May/June 1999. pp. 40-45.

*Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall) and the Pitkin County Library*



# 7. Roof Conservation

## ***Principle:***

The character of the historic roof should be preserved, including its form and materials wherever feasible.

## **Introduction**

The character of the roof is a major feature for most historic structures. When repeated along the street, the repetition of similar roof forms also contributes to a sense of visual continuity for the neighborhood. In each case, the roof pitch, its materials, size and orientation are all distinct features that contribute to the character of a roof. Gabled and hip forms occur most frequently, although shed and flat roofs appear on some building types.

Although the function of a roof is to protect a house from the elements, it also contributes to the overall character of the building. Historically the roof shape was dictated by climatic considerations, which determined roof forms and pitch. Aspen has seen the construction of various roof forms.

## **Roof Deterioration**

The roof is the structures main defense against the elements. However, all components of the roofing system are vulnerable to leaking and damage. When the roof begins to experience failure, many other parts of the house may also be affected. For example, a leak in the roof may lead to damage of attic rafters or even wall surfaces. Common sources of roof leaks include:

- Cracks in chimney masonry
- Loose flashing around chimneys and ridges
- Loose or missing roof shingles
- Cracks in roof membranes caused by settling rafters
- Water backup from plugged gutters or moss accumulation on shingles



*This reroofing job maintains the historic character of the house by using traditional wooden shingles. Note the proper technique of attaching shingles to battens for proper ventilation to enable moisture evaporation, prolonging the life of the roof.*

## **Repairing a Historic Roof Roof Form**

In repairing or altering a historic roof it is important to preserve its historic character. For instance, one should not alter the pitch of the historic roof, the perceived line of the roof from the street, or the orientation of the roof to the street. The historic depth or overhang of the eaves, which is often based on the style of the house, should also be preserved.

### ***Follow these steps:***

#### ***Step 1. Avoid removing historic roofing materials that are in good condition.***

Where replacement is necessary, such as when the historic roofing material fails to properly drain or is deteriorated beyond use, one should use a material that is similar to the original in style and texture. The overall pattern of the roofing material

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also determines whether or not certain materials are appropriate. For instance, cedar and asphalt shingles have a uniform texture, while standing-seam metal roofs cause a vertical pattern.

***Step 2. Match the color of the repaired roof section to the historic roof material.***

Wood and asphalt shingles are appropriate replacement materials for most roofs. A specialty roofing material, such as tile or slate, should be replaced with a matching material whenever feasible.

***Step 3. Do not use metal roof materials, unless the existence of a former metal roof can be demonstrated.***

Use existing material or historic documentation such as photographs to determine if the structure has historically had a metal roof. The use of metal shingle roofs on historic structures is not appropriate because of their texture, application and reflectivity.

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**For additional information:**

- ☞ Park, Sharon C. *Preservation Briefs 19: The Repair and Replacement of Historic Wooden Shingle Roofs*. Washington, D.C.: Technical Preservation Services, National Park Service, U.S. Department of the Interior.
- ☞ Levine, Jeffrey S. *Preservation Briefs 29: The Repair, Replacement and Maintenance of Historic Slate Roofs*. Washington, D.C.: Technical Preservation Services, National Park Service, U.S. Department of the Interior.
- ☞ Grimmer, Anne E. and Paul K. Williams. *Preservation Briefs 30: The Preservation and Repair of Historic Clay Tile Roofs*. Washington, D.C.: Technical Preservation Services, National Park Service, U.S. Department of the Interior.
- ☞ Pieper, Richard. *Preservation Tech Notes: Metals #2: Restoring Metal Roof Cornices*. Washington, D.C.: Technical Preservation Services, National Park Service, U.S. Department of the Interior.

# 8. Historic Finishes

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## ***Principle:***

Proper surface preparation, elimination of moisture problems, and appropriate paint systems are essential for effective protection of exterior surfaces.

## **Introduction**

Paint is a building's first layer of protection, beyond just being an aesthetic detail. Exterior woodwork and paint coverings need routine maintenance. Without question the most critical part of a quality paint job is proper surface preparation. Unless the surface is properly cleaned, dried, treated and primed, the paint will fail prematurely and this will often lead to building material deterioration.

It should be understood by a contractor and any subcontractor that a quality paint job on an historic building is going to involve much more than just painting. The more thorough the understanding of what is required for a lasting paint job will provide clearer documentation in contract specifications.

For large or complex finish jobs on historic buildings, sample patches should be employed and may be considered as part of the bidding procedure.

## **Common causes of moisture problems:**

*Exterior*—leaking roof, leaking gutters, insufficient caulking, improper flashing, landscaping.

*Interior*—poor interior ventilation, improperly insulated walls.

**Always fix moisture problems prior to any surface treatments.**

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## **Required Reading:**

☞ "*Exterior Woodwork-Paint Removal from Wood Siding*" in Preservation Tech Notes. NPS. 1986.

*Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall)*

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## Maintaining Finishes

The following are the appropriate procedures for maintaining finishes on an historic building.

**Follow these steps:**

### **Step 1. Assess conditions**

- Moisture levels in a building surface are usually the result of a design defect or maintenance problem. Peeling and bubbling of paint, especially localized, are indicators of moisture problems. These moisture problems can be a result of either exterior conditions or interior conditions.

### **Step 2. Clean All Surfaces**

- Clean surfaces provide a better indication of the existing conditions, and are necessary for optimum paint adhesion.
- Clean surfaces with the gentlest means possible and be sure any detergents are thoroughly rinsed. Be careful of power washing, which can damage details and substrates and potentially add more moisture to the surface and subsurface. Allow all surfaces to thoroughly dry.

### **Step 3. Remove deteriorated paint**

There is no one best way to remove paint from a building and often numerous methods may need to be employed on different features on one building. Rarely does an entire surface need to be stripped and this practice should be avoided because it will generally damage wood. In the case of significant stripping, always leave an area un-sanded as a 'historic window' to the building's finish history.

Traditional handscraping, although labor intensive, tends to provide the best surface preparation while doing the least amount of damage.

The following methods of paint removal should be evaluated for their appropriateness:

#### **Sanding**

*Pro*—Provides smooth finish, clean substrate.

*Con*—Can damage surfaces, can expose hazardous dust and lead, exposes nailheads prone to rust.

#### **Chemical strippers**

*Pro*—Cost-effective for removal of thick buildup or complex details.

*Con*—Potentially hazardous, very messy.

#### **Heat tools**

*Pro*—Properly used can remove thick layers with minimal substrate damage. Good for flat surfaces.

*Con*—Improperly used can scorch surfaces and introduce fire hazards.

### **Step 4. Prepare the surface**

- Sand all scraped surfaces smooth.
- Fill voids with putty or wood.
- Treat exposed wood with conditioner to prolong the life of the wood and paint job. Natural or synthetic oils will enliven dried-out, weather-beaten wood.
- Treat decay-prone areas with water repellent preservatives (WRP's).

### **Step 5. Prime the surface**

The primer is an integral part of the paint system and should not be skipped. It provides a protective film on the wood and better surface

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## Required Reading:

☞ *Exterior Woodwork-Proper Painting and Surface Preparation* in Preservation Tech Notes. NPS. 1986.

Available at the Historic Preservation Resource Library

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adhesion for topcoats, which contain more pigment and less skin-making binder. Be sure that existing paint layers, new primer and new top coats are compatible. This might necessitate confirmation whether the existing top coats are oil- or latex-based.

- Caulk all gaps after priming with a high quality elastomeric compound that is "paintable."
- Moisture levels in substrate should not exceed 14% when priming.

### **Step 6. Paint surfaces**

Painting is a craft and needs to be approached methodically. Historic buildings require attention to detail, and proper planning. Site and building protection is fundamental to a good job. Paint drips on porch roofs, foundation walls and even landscaping are unacceptable on any quality paint job. Very clear specifications shall be included in the painting contract regarding such matters.

- Sand and dust all prime coat surfaces.
- Write clear specifications on the conditions under which painting will proceed, including temperature and moisture levels. Rushing to get the job done in marginal conditions will lead to premature paint failure.

- Clearly check manufacturer specifications on compatibility of products.

## **What are Historic Colors?**

Historic paint colors and schemes varied throughout the 19th and 20th Century. However, they were generally more subdued and earthtone in nature than most people's conceptions. Replication of exact paint colors dating back to a building's period of significance might not be the goal, or even desirable, especially since some schemes were less than flattering. It is possible to paint a building in appropriate historic colors, while still expressing individual taste.

### **Follow these steps:**

#### **Step 1. Investigate for the historic colors.**

- Look at paint palettes from the building's period of significance.
- Look at "Historic Paint Palettes" by commercial paint companies, but be aware of different historic periods—what was appropriate for a historic Queen Anne is not appropriate for a 1930s Bungalow style house.

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## **Recommended Reading:**

- ☞ Bock, Gordon. "Colorful Issues in Choosing Exterior Paint" in *Old-House Journal*. July/August 1996. pp. 50 - 55.

Available at the Historic Preservation Resource Library in the Historic Preservation Office (Aspen City Hall) and the Pitkin County Library

## **For additional information:**

- ☞ Garskof, Josh. "Prior to Paint" in *Old-House Journal*. July/August. 1994. pp. 32- 37.
- ☞ Park, Sharon. *Preservation Brief 37: Appropriate Methods for Reducing Lead-Paint Hazards in Historic Housing*. National Park Service. U.S. Department of the Interior. 1995.
- ☞ Park, Sharon. *Preservation Brief 10: Exterior Paint Problems on Historic Woodwork*. National Park Service. U.S. Department of the Interior.

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*For more exact identification, chemical or laboratory analysis can be performed for a minimal cost by a preservation consultant or architectural conservator.*

- Physically investigate different building elements by scraping with a razor blade down to the substrate, sanding the edges of the pit and coating with a layer of mineral oil to reveal the paint layers. This will provide general concepts.

***Step 2. Choose a color palette.***

- Choose from among the period color cards of the building's era.
- Choose colors that relate to the natural color schemes of the area—for example, many historic paints were based upon naturally occurring earth pigments.
- Consider practicality—the more elaborate the paint scheme, the more maintenance is required and the more apparent is surface degeneration.
- Isolate whimsical colors to accent areas and consider the context of the building.
- Consider how the paint scheme will fit into the community.

# 9. Additional Resources

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## Technical Publications

The following publications are produced by the National Park Service, Heritage Preservation Services, and are available from the State Historic Preservation Office, or the National Park Service Heritage Preservation Services free publications website:

- [www2.cr.nps.gov/freepubs/htm](http://www2.cr.nps.gov/freepubs/htm)  
*or*
- [www2.cr.nps.gov/tps/briefs/presbhom.htm](http://www2.cr.nps.gov/tps/briefs/presbhom.htm)

## Preservation Briefs

1. The Cleaning and Waterproof Coating of Masonry Buildings
2. Repointing Mortar Joints in Historic Brick Buildings
3. Conserving Energy in Historic Buildings
4. Roofing For Historic Buildings
5. The Preservation of Historic Adobe Buildings
6. Dangers of Abrasive Cleaning to Historic Buildings
7. The Preservation of Historic Glazed Architectural Terra-Cotta
8. Aluminum and Vinyl Siding on Historic Buildings: The Appropriateness of Substitute Materials for Resurfacing Historic Wood Frame Buildings
9. The Repair of Historic Wooden Windows
10. Exterior Paint Problems on Historic Woodwork
11. Rehabilitating Historic Storefronts
12. The Preservation of Historic Pigmented Structural Glass (Vitrolite and Carrara Glass)
13. The Repair and Thermal Upgrading of Historic Steel Windows
14. New Exterior Additions To Historic Buildings: Preservation Concerns
15. Preservation of Historic Concrete: Problems and General Approaches
16. The Use of Substitute Materials on Historic Building Exteriors
17. Architectural Character - Identifying The Visual Aspects of Historic Buildings as an Aid to Preserving Their Character
18. Rehabilitating Interiors in Historic Buildings—Identifying Character—Identifying Elements
19. Repair and Replacement of Historic Wooden Shingle Roofs
20. The Preservation of Historic Barns
21. Repairing Historic Flat Plaster—Walls and Ceilings
22. The Preservation and Repair of Historic Stucco
23. Preserving Historic Ornamental Plaster

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|---|---|
| 24. Heating, Ventilating, and Cooling Historic Buildings: Problems and Recommended Approaches | 33. The Preservation and Repair of Historic Stained Glass                                     |
| 25. The Preservation of Historic Signs  | 34. Applied Decoration for Historic Interiors: Preserving Composition Ornament                |
| 26. The Preservation and Repair of Historic Log Buildings                                     | 35. Understanding Old Buildings: The Process of Architectural Investigation                   |
| 27. The Maintenance and Repair of Architectural Cast Iron                                     | 36. Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes |
| 28. Painting Historic Interiors   | 37. Appropriate Methods for Reducing Lead-Paint Hazards in Historic Houses                    |
| 29. The Repair, Replacement, and Maintenance of Historic Slate Roofs                          | 38. Removing Graffiti from Historic Masonry   |
| 30. The Preservation and Repair of Historic Clay Tile Roofs                                   | 39. Holding the Line: Controlling Unwanted Moisture in Historic Buildings                     |
| 31. Mothballing Historic Buildings  | 40. Preserving Historic Ceramic Tile Floors   |
| 32. Making Historic Properties Accessible   | 41. Seismic Retrofit of Historic Buildings  |

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## Presevation Tech Notes

Doors No. 1: Historic Garage and Carriage Doors: Rehabilitation Solutions

Exterior Woodwork No. 1: Proper Painting and Surface Preparation

Exterior Woodwork No. 2: Paint Removal from Wood Siding

Exterior Woodwork No. 3: Log Crown Repair and Selective Replacement Using Epoxy and Fiberglass Reinforcing Rods

Exterior Woodwork No. 4: Protecting Woodwork Against Decay Using Borate Preservatives

Finishes No. 1: Process-Printing Decals as a Substitute for Hand Stenciled Ceiling Medallions

Historic Interior Spaces No. 1: Preserving Historic Corridors in Open Space Office Plans

Historic Interior Spaces No. 2: Preserving Historic Office Building Corridors

Maintenance No. 1: Preventative Care for Classical Lighthouse Lenses

Masonry No. 1: Substitute Materials: Replacing Deteriorated Serpentine Stone with Pre-Cast Concrete

Masonry No. 3: Water Soak Cleaning of Limestone

Masonry No. 4: Non-Destructive Evaluation Techniques for Masonry Construction

Mechanical Systems No. 1: Replicating Historic Elevator Enclosures

Metals No. 1: Conserving Outdoor Bronze Sculpture

Metals No. 3: In-kind Replacement of Historic Stamped-Metal Exterior Siding

Museum Collections No. 1: Museum Collection Storage in a Historic Building Using a Prefabricated Structure

Metals No. 4: Relocating and Retrofitting Historic Iron Bridges

Temporary Protection No. 1: Temporary Protection of Historic Interiors During Construction and Repair

Windows No. 11: Installing Insulation Glass in Existing Wooden Sash Incorporating the Historic Glass

Windows No. 17: Repair and Retrofitting Industrial Steel Windows

Windows No. 18: Aluminum Replacement Windows with True Divided Lights, Interior Piggyback Storm Panels, and Exposed Historic Wooden Frames

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## On-Line Resources

Electronic Rehabilitation Course through the National Park Service.

- [www2.cr.nps.gov/e-rehab](http://www2.cr.nps.gov/e-rehab)

Heritage Preservation Services—Technical Preservation Services

- [www2.cr.nps.gov](http://www2.cr.nps.gov)

National Park Service

- [www.cr.nps.gov](http://www.cr.nps.gov)
- Preservation Publications, ordering e-mail: [hps-info@nps.gov](mailto:hps-info@nps.gov)

National Center for Preservation Technology

- [www.ncptt.nps.gov](http://www.ncptt.nps.gov)

National Trust for Historic Preservation

- [www.nthp.org](http://www.nthp.org)
- Information Series:  
[www.InfoSeries.com](http://www.InfoSeries.com)

PreserveNet

- [www.preservnet.cornell.edu](http://www.preservnet.cornell.edu)

Technical Preservation Services

- Publications, Partnership Sales:  
[www2.cr.nps.gov/tps](http://www2.cr.nps.gov/tps)

## Journals and Periodicals

### **APT Bulletin**

Published Quarterly by the Association for Preservation Technology International, contains general articles and case studies for the conservation of historic structures.

- APT Bulletin  
P.O. Box 3511, Williamsburg, VA 23187  
(540) 373-1621
- On-line:  
[www.apti.org](http://www.apti.org)

### **CRM (Cultural Resource Magazine)**

Published by the National Park Service and contains articles about building preservation and conservation.

- On-line:  
[www.ncptt.nps.gov](http://www.ncptt.nps.gov)

### **Historic Preservation**

Published by the National Trust for Historic Preservation, includes articles on the field of historic preservation, specific projects and organizations.

- NTHP  
1785 Mass. Avenue, N.W., Washington, D.C.  
20036  
(800) 944-6847
- e-mail: [members@nthp.org](mailto:members@nthp.org)

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### **Old-House Journal**

Popular magazine primarily for private owners of older houses, contains technical articles and design ideas.

- (800) 234-3797
- On-line:  
[www.oldhousejournal.com/ohj.html](http://www.oldhousejournal.com/ohj.html)

### **Preservation Briefs**

Published by the Preservation Assistance Division of the National Park Service. These are professional articles on procedures for rehabilitating historic structures according to federal standards.

- On-line:  
[www2.cr.nps.gov/freepubs](http://www2.cr.nps.gov/freepubs)

### **Preservation Tech Notes**

Published by the National Park Service, these are designed to provide practical information on techniques and practices for building and historic resource conservation.

- On-line:  
[www2.cr.nps.gov](http://www2.cr.nps.gov)

### **Traditional Building**

This subscription journal discusses and lists sources for preservation materials and services, applicable to preservation projects of all scales.

- 69A Seventh Avenue, Brooklyn, NY 11217
- On-line:  
[www.traditional-building.com](http://www.traditional-building.com)

## **Professional Organizations**

### **Association for Preservation Technology International**

- APT, PO Box 3511, Williamsburg, VA 23187
- (540) 373-1621
- [www.apti.org](http://www.apti.org)

### **Colorado Historical Society**

- Offices of Technical Assistance  
(303) 866-3741
- [www.history.state.co.us/oahp](http://www.history.state.co.us/oahp)

### **Colorado Preservation, Inc.**

- (303) 893-4260
- [www.aclin/org/other/historic/cpi](http://www.aclin/org/other/historic/cpi)

### **CoPin—Colorado Preservation Information Network**

- (303) 866-4678
- [www.copin.org](http://www.copin.org)

### **Preservation Trades Network**

- P.O. Box 1815, Rockville, MD 20849-1815
- [www.prginc.com](http://www.prginc.com)

