

Chapter 2. Building Materials & Finishes

Context & Character

The architectural forms and styles in Salt Lake’s historic residential neighborhoods are usually carefully articulated in a variety of primary building materials. These materials are generally of high decorative and structural quality, durable and usually resistant to premature deterioration if understood and cared for through basic maintenance.

Brick and wood siding are typical primary building materials. Stone and adobe were also used, although adobe frequently was stuccoed or clad with clapboard siding. Terra-cotta and cast masonry were used for decorative detailing. Concrete and concrete block were also increasingly used as the 20th century progressed. While wood siding occurred in a variety of forms, 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 materials, including the scale of the material unit, its texture and finish, contribute to the historic character of a building. These materials may form the external structural wall or may be the external cladding system. Contrasting materials, colors or textures are often employed for decorative detail and embellishment in the form of framing for doors and windows or belt courses.

CONTEXT & CHARACTER	2 : 1
DESIGN OBJECTIVE	2 : 3
GENERAL	2 : 3
MASONRY	2 : 4
WOOD	2 : 7
METAL	2 : 9
CLEANING MATERIALS & METHODS	2 : 10
REPAIR	2 : 11
PAINT & OTHER COATINGS	2 : 12
ADDITIONAL INFORMATION	2 : 15

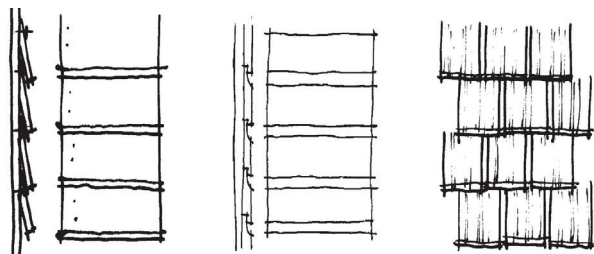


Historic architecture in the city makes decorative use of a rich palette of materials, colors and finishes.

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

Typical historic building materials in Salt Lake City

Wood Siding

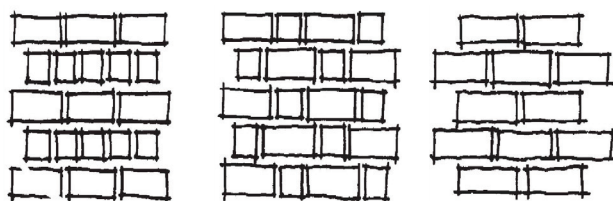


Clapboard

Drop or Novelty

Shingle

Masonry Wall Patterns



English Brick

Flemish Brick

American Stretcher



Original materials are essential to the integrity of a building and convey a sense of authenticity and maturity.

In some cases, historic building materials may have 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.

When deterioration has occurred, repair the material after addressing any other related problems that might be the cause. In most cases damaged materials can be patched or consolidated.

In other situations, however, some portions of the material may be beyond repair. In such a case replacement will be required. With primary historic building materials, the new material should match the original if feasible. 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 and integrity of the property as a historic resource. Even when the replacement material exactly matches that of the original, the integrity of a historic building is to some extent compromised with the loss of original or early materials. This is because the original material exhibits a record of the labor and craftsmanship of an earlier time and this is lost when it is replaced. Original materials also help to define the authenticity, integrity, and help to convey the age, maturity and 'patina' of the building.

It is also important to recognize that all materials will weather over time and that a scarred or weathered finish does not represent an inferior material or structural problems, but simply reflects the age and maturity of the building. This 'patina of age' is a tangible and distinct characteristic of any historic building or neighborhood. In some respects they acquire the wisdom that comes with long-standing experience. Preserving original materials that show signs of wear and age is therefore preferred to their replacement. Cleaning methods, specifically abrasive, high pressure and chemical cleaning, can severely damage or destroy primary building materials, and in general should be avoided.

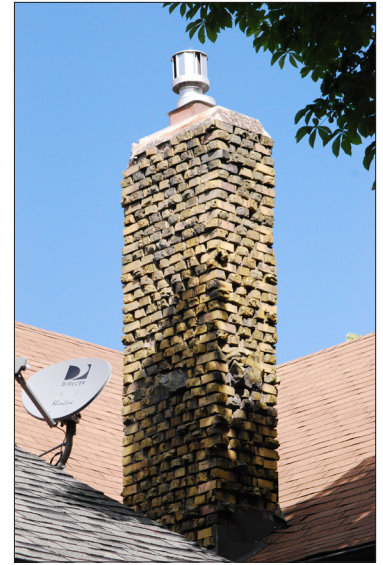
Design Objective

Primary historic building materials should be preserved in place whenever feasible. When the material is damaged, then limited replacement, matching the original, may be considered. Primary building materials should never be covered or subjected to harsh cleaning treatments.

General

2.1 Primary historic building materials should be retained in place whenever feasible.

- Limit replacement to those materials that cannot be repaired.
- When the material is damaged beyond repair, match the original wherever feasible.
- Covering historic building materials with new materials should be avoided.
- Avoid any harsh cleaning treatments, since these may cause permanent damage to the material.



The variety of brick and siding, the color variation, patterns and textures, create a rich visual experience and help to establish a sense of human scale.



Brickwork lends itself to an endless variety of creative architectural compositions with associated decorative relief and textures.

Masonry

Masonry includes a range of solid construction materials. The following guidelines apply to the masonry surfaces, features, and details of historic buildings in the city's designated residential districts.

Masonry in its many forms is one of the most important character-defining features of a traditional building. Brick, stone, adobe, terra-cotta, ceramics, stucco, cast artificial stone, and concrete are typical masonry construction materials used across the city, reflecting its sequence of settlement and development, as well as personal means and architectural style. Masonry materials of various types exist as walls, cornices, pediments, steps, chimneys, foundations, and functional and/or decorative building features and details.

In a brick wall, the particular size of brick used and the manner in which it is laid is a distinctive characteristic. Similarly, the pattern or 'bond' in the construction of a brick or stone wall helps to establish its character. This pattern combines with the choice and nature of the material, the choice of cut, rough and/or dressed stone, to create a unique physical and visual character.

Masonry is usually comprised of the masonry unit, e.g. the individual brick or stone, and the medium used to bind these units, e.g. the mortar, each with a mutually supporting role. The pattern used to lay the brick (the bond) is directly influenced by the hardness, color, thickness and profile of the mortar coursing with which it is laid. Historically, a soft mortar was used. In post-war years the use of a harder brick was matched by a harder mortar. The mortar should always be softer than the brick or the stone.

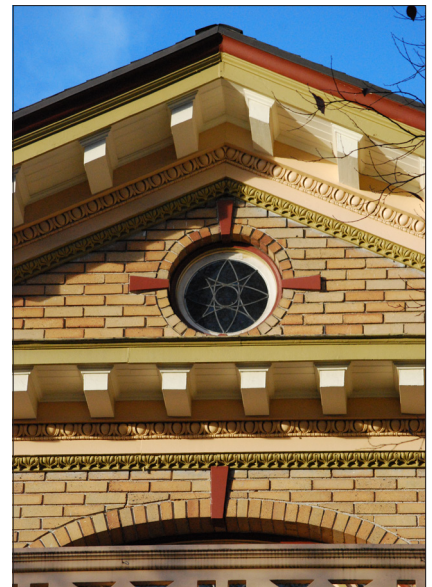
In earlier masonry buildings, a soft mortar was used, which employed a high ratio of lime. (Little, if any, Portland cement was used.) This soft mortar was usually laid with a finer joint than we see today. The inherent color of the material was also an important characteristic; mortars would be mixed using sand colors to match or contrast with the brick. The size of the bricks contributed to the sense of scale of the wall and building, expressed by the profile and color of the mortar joints; both express a range of construction patterns or brick bonds. When repointing such walls, it is important to use a mortar mix that approximates the original in color, texture and strength.

Most contemporary mortars are harder in composition than those used historically. They should not be used in mortar repairs because this stronger material is often more durable than the brick itself, causing the brick to fracture or spall during movement or moisture evaporation/freezing. When a wall moves during the normal changes in season and temperatures, the brick units themselves can be damaged and spalling of the brick surface can occur.

Normally, moisture within the wall should be able to evaporate through the softer (“sacrificial”) mortar course, requiring repointing after a number of years. Where the mortar is harder than the brick, water evaporates through the brick, damaging and destroying its harder surface. If moisture in the brick freezes, it accelerates the deterioration.

2.2 Traditional masonry surfaces, features, details and textures should be retained.

- Regular maintenance will help to avoid undue deterioration in either structural integrity or appearance



Brickwork, including the bond and mortar joint width and profile, may be an essential component of the architectural character.



Variation in the brick texture and the pointing profile are used in this case to define the wall, the window bay and the chimneys.



Matching the existing brick pattern or bond and the composition of the mortar help to ensure the integrity of the brick and stonework and consequently architectural character.

2.3 The traditional scale and character of masonry surfaces and architectural features should be retained.

- This includes original mortar joint characteristics such as profile, tooling, color, and dimensions.
- Retain bond or course patterns as an important character-defining aspects of traditional masonry.

2.4 Match the size, proportions, finish, and color of the original masonry unit, if replacement is necessary.

2.5 The existing mortar mix should be retained if it was designed for the physical qualities of the masonry.

- Retain original mortar in good condition.
- Match the mix of the existing mortar as closely as possible when re-pointing mortar.
- Ensure that the strength of the mortar mix is weaker than the material it bonds, since it will damage the existing brick or stone otherwise.
- Mortar is intended to be the sacrificial (see Glossary) component of a masonry system.
- When the mortar mix is harder than the strength of the masonry units, the brick or block will be damaged and deterioration accelerated as the new system ages.
- If previous re-pointing mix is comprised of hard cement mortar (e.g. “Portland cement”), this should be removed and the masonry re-pointed with an appropriate mortar mix.
- Mortar mix for re-pointing original masonry should be compatible with the qualities of the masonry, local climate characteristics and exposure to extremes of weather.

2.6 Masonry that was not painted traditionally should not be painted.

- Brick has a hard outer layer, also known as the ‘fire skin,’ that protects it from moisture penetration and deterioration in harsh weather.
- Natural stone often has a similar hard protective surface created as the stone ages after being quarried and cut.
- Painting traditional masonry will obscure and may destroy its original character.
- Painting masonry can trap moisture that would otherwise naturally evaporate through the wall, not allowing it to “breathe” and causing extensive damage over time.
- See also the discussion on Cleaning Materials and Methods below.

2.7 Protect any masonry structures from water deterioration.

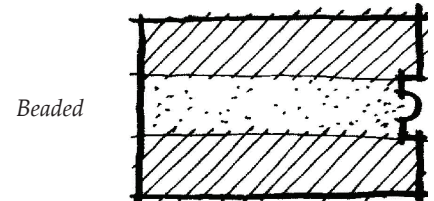
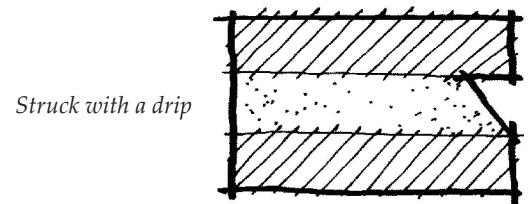
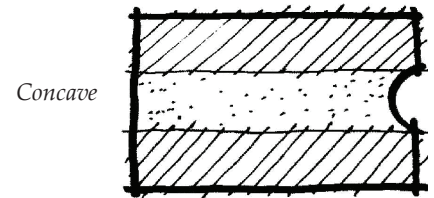
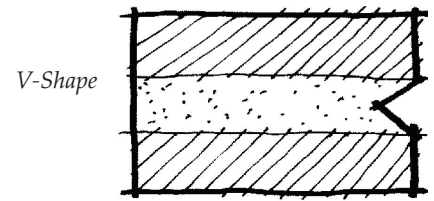
- Provide proper drainage so that water does not stand on horizontal surfaces or accumulate in decorative features.
- Provide positive drainage away from masonry foundations to minimize rising moisture.

Maintenance Tip

*When repointing eroded mortar in a masonry wall, use a recipe for new mortar that is similar to the original in color, texture and hardness. This will ensure that damage will not occur from the use of mortar that is harder than the brick or stone, and that the detailed craftsmanship and character of the building is retained. Originally, a mortar mix of 5 parts sand, 2 parts lime, 0 parts cement was used.**

** Up to 0.5 parts cement may be OK.*

Typical masonry joint types



Brickwork can be used as a sculptural architectural medium, combining visual drama and complexity.



Wood is perhaps the single most important material for decorative architectural features and detail in all city historic neighborhoods. It is also a very resilient and durable material.

Wood

Wood has been used historically for framing, exterior siding, trim, ornamental details and in 'log' form as a complete construction material. Traditional wood framing and cladding were usually carefully selected, cut and seasoned. Whether used for construction, principal elements such as windows and doors, or for trim and detail, early wood tends to be tough and durable. It is worth retaining for reasons of historic integrity and its enduring physical qualities. New replacement wood is unlikely to match these same physical qualities, resilience and durability. Historic wood windows are reviewed in Ch.3 Windows.

When properly maintained, historic wood will have a long lifespan. Early woodwork should be retained and if necessary repaired. New sections can be readily spliced in. Painted surface finishes should be maintained in order to preserve originally painted exterior wood features and details.

2.8 Original wood siding should be preserved.

- Avoid removing siding that is in good condition or that can be repaired in situ.
- Only remove the siding which has deteriorated beyond repair.
- Match the dimensions, form, style, profile, detail and finish of the original or existing siding, if new siding is required.

Maintenance Tip

Most wood siding in Salt Lake City was manufactured locally, and can be easily replicated by local mills.

2.9 Protect wood features from deterioration.

- Provide proper drainage and ventilation to minimize decay.
- Maintain protective paint coatings to decrease damage from moisture.
- If the building was painted historically, it should remain painted, including siding and trim.

2.10 Repair wood features by patching, piecing-in, consolidating, or otherwise reinforcing the wood wherever necessary.

- Match the form, dimensions, profile, and detail of the original wood feature when patching, piecing in or repairing wood features.

2.11 Original wood cladding and siding should not be covered.

- Avoid obscuring these character-defining features of the building.
- Aluminum or vinyl siding applied over original wood siding traps water vapor and moisture, and leads to physical deterioration and failure of new and original building materials.
- Remove non-original or non-traditional siding at the earliest opportunity, for this reason.
- Repair the underlying original siding as required.

Metal

Metals in historic buildings were used in a variety of applications including columns, roofing, canopies, storefronts, window frames, and decorative features. The types of metals used include cast iron, steel, aluminum, lead, bronze, brass, and copper. Metals should therefore be retained and repaired, wherever this is possible



Chosen for its qualities of resilience and adaptability, metal has provided a versatile medium for fine decorative detailing, including cornice profiles, soffit paneling and railings.



Finely detailed brickwork warrants special care in maintenance or repair.



Mature and weathered stonework, here contrasted with a new cornice profile, demonstrates a sense of architectural time and history.

2.12 Architectural metal features that contribute to the historic character of the building should be retained and repaired.

- All original or early metals are part of the historic architectural character of the building.
- Ensure proper drainage on metal surfaces to minimize water retention and deterioration.
- Restore protective coatings, such as paint, on exposed metals that have been traditionally coated.

2.13 Repair traditional metal features by patching, consolidating, or otherwise reinforcing the original.

- Only replace the original metal feature in its entirety if the majority of the feature is deteriorated beyond repair.
- New metal should be compatible with the original, not only to preserve visual character but to prevent galvanic reactions and accelerated deterioration of original and/or replacement metal.

Cleaning Materials & Methods

Original building materials rarely need to be cleaned. Some cleaning materials and methods can harm the building fabric. Many cleaners can be harsh and abrasive, often permanently damaging the surface and durability of building materials, such as brick and stone. In particular, abrasive cleaning methods can remove the hard outer layer of masonry material, and thereby accelerate the deterioration and failure of the masonry. When maintaining historic buildings, only cleaning materials and methods that do not harm the original building materials should be used. Cleaning is a specialized area of expertise, and much irreparable damage can be caused by inexperience or misapplication.

See also the discussion regarding Masonry above. Refer to the information and advice contained in the National Park Service Technical Preservation Services Preservation Briefs (Referenced at the end of this chapter and in the Appendix).

2.14 Cleaning original building materials should be avoided in most circumstances.

2.15 Use the gentlest cleaning method possible to achieve the desired result, if cleaning is needed.

- Avoid abrasive cleaning methods including sandblasting, pressurized water blasting, or other blasting techniques using any kind of materials, such as soda, silica, or nut shells.
- Research appropriate cleaning methods for the material and the location prior to any cleaning procedures. (See in particular the references sources at the end of this chapter and in the Appendix.)
- Test any proposed cleaning in a small, less visible, location first.
- Hire a specialist in the cleaning of historic buildings to advise on the lowest impact method of cleaning.

Repair

2.16 Repair deteriorated primary building materials.

- Isolated areas of damage may be stabilized or strengthened, using consolidants.
- Resins and epoxies are effective for wood repair.
- Special repair compounds for brick, stone and terra-cotta are also available.



Great care is required to ensure that if cleaning is really required this is achieved using the gentlest means possible, and not using abrasive methods. In contrast to the care taken above, the brick surface below has been completely destroyed using abrasive cleaning methods.



The appearance and integrity of the original masonry can be successfully maintained through appropriate repair.



Removing later materials may reveal the original materials, such as this siding, which with care can be successfully repaired.

Safety concerns relating to handling lead-based paint should be borne in mind when working with paintwork dating from before 1978. Recommendations and/or requirements for lead-safe working should be reviewed prior to any work. Lead-based paint should not be considered a reason to remove and replace historic, character-defining materials or features, including windows, doors details and trim. There are remedial techniques which can be used to either safely remove or encapsulate any lead-based paint. See the accompanying links for further information.

www.preservationnation.org/issues/lead-paint/

<http://www.nps.gov/tps/how-to-preserve/briefs/37-lead-paint-hazards.htm>

2.17 When repointing masonry, preserve original mortar characteristics, including composition, profile, and color.

- In some cases, matching the composition of the historic mortar mix will be essential to the preservation of the brick itself.

2.18 Consider removing later covering materials, except where these might have achieved historic significance.

- Repair of the original material may be required after it is uncovered.
- Removal of other materials, such as stucco, should be tested in a small area to ensure that the original material will not be damaged.
- If masonry has a stucco finish, removing the covering may be difficult and may reveal extensive damage to the original material. For example, original brickwork was sometimes chipped to provide a 'key' for the stucco.
- If removing stucco is considered, first remove the material from a test patch to determine the condition of the underlying masonry.

Paint & Other Coatings

Historic buildings that were clad with wood siding were usually painted to protect the wood. Some stucco, brick, and concrete buildings may also have been painted. Masonry surfaces that have not been painted, or that were not painted historically, such as stone, brick, and terra-cotta, should not be painted. Usually these materials were chosen for their decorative as well as their functional qualities. To paint over these characteristics will adversely affect the historic integrity of the building.

Painting brick or stone is rarely if ever warranted to enhance water resistance. Rather, it tends to seal moisture into the wall, hastening deterioration.

Although **color is not a matter considered by the City in design review**, consider using historic color schemes when undertaking regular maintenance of painted surfaces, including wood windows, doors, and trim. Refer also to the discussion on historic color in Ch.11 General Issues.

A considered color scheme for the building will enhance appreciation of historic architectural character and its contribution to the streetscape. If the original color scheme is unknown, choose several discrete locations to sample paint layer history. Historic photographs can also be consulted. While these are usually black and white, the photos show relative color values (darks and lights) used on the building. Generally, one muted color would be considered appropriate as a background unifying the building form and mass. For accents, one or two additional colors would be appropriate to highlight building details and trim. In the absence of historic photographs or physical paint layers, an interpretation of paint colors on similar historic buildings is appropriate.

2.19 Prepare the surface or substrate well prior to applying new paint.

- Remove damaged or deteriorated paint only to the next intact layer using the gentlest method possible.
- Do not paint previously unpainted masonry surfaces.
- Consider removing paint from previously painted masonry surfaces that were not painted historically.



Periodic maintenance of painted surfaces maintains weather resistance and enhances the character of the building.



Color can be used to complement the texture and qualities of the materials and detailing.



Materials and details express architectural celebration throughout the historic districts.

2.20 Use paint products designed for the existing materials and the environmental conditions of the locations.

- Follow the manufacturer's directions when applying paint products.
- Use primer coats as directed by the paint manufacturer's instructions. Some latex paints, for example, will not bond well to earlier oil-based paints without a primer coat or proper surface preparation.
- Employ special procedures for removal, preparation for new paint, or encapsulation of older paint layers that may contain lead.

2.21 Maintaining or re-establishing the historic color scheme is appropriate.

- Research what the historic painting scheme had been and use it as a basis for deciding on a new color scheme if the historic scheme is not otherwise known.
- Sample paint layer history in a discrete location, using a simple means of sanding through each layer revealing the color of different paint layers through time.
- Professional paint analysis and color matching is also an option.
- Use a comprehensive color scheme for a building's entire exterior, so that upper and lower floors and subordinate masses of a building are seen as components of a single structure.
- Refer to Ch.11 General Issues for further discussion on historic color.

Additional Information

Masonry & Ceramics

De Teel Patterson Tiller. *Preservation Briefs 7: The Preservation of Historic Glazed Architectural Terra-Cotta*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1979
<http://www.nps.gov/tps/how-to-preserve/briefs/7-terra-cotta.htm>

Grimmer, Anne. *Preservation Briefs 22: The Preservation and Repair of Historic Stucco*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1990
<http://www.nps.gov/tps/how-to-preserve/briefs/22-stucco.htm>

Gaudette, Paul and Deborah Slaton. *Preservation Briefs 15: Preservation of Historic Concrete*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 2006
<http://www.nps.gov/tps/how-to-preserve/briefs/15-concrete.htm>

London, Mark. *Respectful Rehabilitation - Masonry - How to Care for Old and Historic Brick and Stone*. Washington, DC: The National Trust for Historic Preservation, 1988
<http://books.google.com/books/about/Masonry.html?id=C0ZSAAAAMAAJ>

Mack, Robert C., FAIA; Anne Grimmer. *Preservation Briefs 1: Cleaning and Water-Repellent Treatments for Historic Masonry Buildings*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 2000
<http://www.nps.gov/tps/how-to-preserve/briefs/1-cleaning-water-repellent.htm>

Pieper, Richard. *Preservation Briefs 42: The Maintenance, Repair and Replacement of Historic Cast Stone*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 2006
<http://www.nps.gov/tps/how-to-preserve/briefs/42-cast-stone.htm>

Preservation Briefs 5: The Preservation of Historic Adobe Buildings. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1978
<http://www.nps.gov/tps/how-to-preserve/briefs/5-adobe-buildings.htm>

Preservation Briefs 12: The Preservation of Historic Pigmented Structural Glass (Vitrolite and Carrara Glass). Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1984
<http://www.nps.gov/tps/how-to-preserve/briefs/12-structural-glass.htm>

Wood

O'Bright, Alan. *Preservation Technical Notes. Exterior Woodwork #2: Paint Removal from Wood Siding*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1986
www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Exterior02.pdf

Park, Sharon C. *Preservation Technical Notes. Exterior Woodwork #1: Proper Painting and Surface Preparation*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1986
www.nps.gov/tps/how-to-preserve/tech-notes/Tech-Notes-Exterior01.pdf

Weeks, Kay D. and David W. Look, AIA. *Preservation Briefs 10: Exterior Paint Problems on Historic Woodwork*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior
<http://www.nps.gov/tps/how-to-preserve/briefs/10-paint-problems.htm>

See also "Utah's Historic Architecture" Glossary
<http://history.utah.gov/architecture/glossary.html>

Metals

Waite, John G., AIA. *Preservation Briefs 27: The Maintenance and Repair of Architectural Cast Iron*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1991
<http://www.nps.gov/tps/how-to-preserve/briefs/27-cast-iron.htm>

Cleaning & Repair

Grimmer, Anne E., FAIA. *Preservation Briefs 6: Dangers of Abrasive Cleaning to Historic Buildings*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1979
<http://www.nps.gov/tps/how-to-preserve/briefs/6-dangers-abrasive-cleaning.htm>

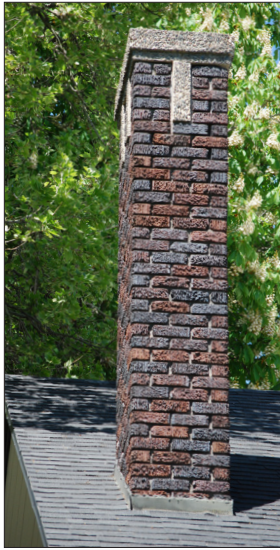
Mack, Robert C., FAIA, and John P. Speweik. *Preservation Briefs 2: Repointing Mortar Joints in Historic Masonry Buildings*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1998
<http://www.nps.gov/tps/how-to-preserve/briefs/2-repoint-mortar-joints.htm>

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, US Department of the Interior. 1984
<http://www.nps.gov/tps/how-to-preserve/briefs/8-aluminum-vinyl-siding.htm>

Park, Sharon C., AIA, and Douglas C. Hicks. *Preservation Briefs 37: Appropriate Methods of Reducing Lead-Paint Hazards in Historic Housing*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 2006
<http://www.nps.gov/tps/how-to-preserve/briefs/37-lead-paint-hazards.htm>

Park, Sharon C., AIA. *Preservation Briefs 39: Holding the Line: Controlling Unwanted Moisture in Historic Buildings*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1996
<http://www.nps.gov/tps/how-to-preserve/briefs/39-control-unwanted-moisture.htm>

PART II Design Guidelines



Effective use of texture in stone, brick and concrete.

Park, Sharon, FAIA. *Preservation Briefs 47: Maintaining the Exterior of Small and Medium Size Historic Buildings*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 2007

<http://www.nps.gov/tps/how-to-preserve/briefs/47-maintaining-exterior.htm>

Weaver, Martin E. *Preservation Briefs 38: Removing Graffiti from Historic Masonry*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1995

<http://www.nps.gov/tps/how-to-preserve/briefs/38-remove-graffiti.htm>

Energy Efficiency

Hensley, Jo Ellen and Aguilar, Antonio. *Preservation Briefs 3: Improving Energy Efficiency in Historic Buildings*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 2011

<http://www.nps.gov/tps/how-to-preserve/briefs/3-improve-energy-efficiency.htm>

Other

Park, Sharon C., *Preservation Briefs 16: The Use of Substitute Materials on Historic Building Exteriors*. Washington, DC: Technical Preservation Services Division, National Park Service, US Department of the Interior. 1988

<http://www.nps.gov/tps/how-to-preserve/briefs/16-substitute-materials.htm>

Historic Color

For information on historic color please see Chapter 11; "Additional Information"