



# Leesburg

APPENDIX B:  
MAINTENANCE AND  
REHABILITATION



## 1. Wood

Wood requires regular maintenance. The main objective is to keep it free from water infiltration and wood-boring pests.

### a. General Maintenance

- i. Inspect wood surfaces for signs of water damage, rot, and pest infestation.
- ii. Even though wood may look deteriorated, it may be strong enough to repair with epoxy products specifically formulated for wood preservation. To test the condition of wood materials, insert an ice pick perpendicular to the wood grain. If it penetrates less than 1/8", the wood is solid; if it is more than 1/2," it may have dry rot.
- iii. Keep all surfaces primed and painted in order to prevent water infiltration. Retain protective surface coatings.
- iv. Identify sources of moisture problems and take appropriate measures to remediate them including:
  - Remove vegetation that grows too closely to wood
  - Repair leaking roofs, gutters, downspouts, and flashing
  - Ensure proper ventilation
  - Maintain proper drainage around the foundation to prevent standing water and backsplash
  - Recaulk joints where moisture might penetrate a building.  
*Note:* Do not caulk under individual siding boards or window sills as this action seals the building too tightly and can lead to moisture problems within the frame walls and paint failure
- v. When cleaning or preparing surfaces for a new treatment, use the gentlest means possible.

## 2. Masonry

Most major masonry problems can be avoided with monitoring and preventative maintenance. Prevent water from causing deterioration by ensuring proper drainage, removing vegetation too close to the building, repairing leaking roof and gutter systems, securing loose flashing around chimneys, and caulking joints between masonry and wood.

### a. General Maintenance

- i. Monitor the effects of weather on the condition of mortar and masonry units and ensure that improper water drainage is not the cause of the deterioration.
- ii. Prevent water from gathering at the base of a wall by ensuring that the ground slopes away from the wall or by installing drain tiles.
- iii. Repair leaking roofs, gutters, and downspouts; and secure loose flashing.
- iv. Caulk the joints between the masonry and the door and window frames to prevent water penetration.
- v. Examine masonry for cracks and unsound mortar. Disintegrating mortar, open joints, loose masonry units, or damaged interior plaster may indicate the need for masonry repair.
- vi. Identify any cracks that may indicate structural issues (e.g. movement, differential settlement, arch failure). Consult with a preservation specialist to determine their causes and appropriate remedial treatments.
- vii. Repair cracks and unsound mortar according to the following guidelines.
- viii. Clean masonry only when necessary to remove heavy paint buildup or soiling, or to halt deterioration. Refer to the following guidelines for cleaning masonry the considerations for cleaning that follow.
- ix. Repair any water damage to the underlying structure to provide a sound base for necessary stucco repairs.



## APPENDIX B: MAINTENANCE AND REHABILITATION

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### B. Masonry, continued

#### b. General Cleaning Methods for Masonry

##### i. Water Cleaning

Generally the simplest, gentlest and least expensive cleaning method. Water cleaning methods include hand scrubbing, spraying and pressure washing. For hand washing, use natural or nylon bristle brushes – never use metal brushes or scrapers. Intermittent water spraying, misting or dripping may be used to clean masonry surfaces. Soiling may be removed with pressurized water washing or rinsing at low (400-600 psi), moderate (600-800 psi) and high pressure (over 800 psi). When pressure washing, care must be taken to maintain a sufficient distance from the substrate (at least 9”), to use the appropriate pressure for the type of masonry and its condition and to use proper nozzle tips (15-45 degree fan tip).

##### ii. Chemical Cleaning

Chemical cleaning is a generally acceptable method for removing soiling from masonry. However, if it is not properly utilized, chemical cleaning can cause damage (e.g. staining, efflorescence) to masonry. Proprietary chemical cleaning systems are generally based on acids, alkalis or organic compounds. Use products which are specifically formulated for cleaning masonry.

- *Acidic Cleaners*

Acidic cleaners are typically appropriate for granites, sandstones, non-calcareous stones and unglazed brick. They are usually based on hydrofluoric acid. Hydrochloric acid is generally not recommended for cleaning old masonry. Acidic cleaners are not appropriate for limestone, marble, sandstones containing calcium carbonate, and polished surfaces.

- *Alkaline Cleaners*

Alkaline cleaners are appropriate for limestone, marble, glazed brick and terra cotta. These cleaners are typically based on potassium or sodium hydroxide. Alkaline cleaning systems for masonry often require a neutralizing rinse with a mildly acidic solution to prevent efflorescence (salts).

- *Biocidal Cleaners*

Biocidal cleaners, which are generally based on quaternary ammoniums, may be utilized to remove biological growth (algae, lichens, moss) on masonry.

- *Detergents*

Non-ionic detergent solutions may be used to remove light general soiling on masonry.

- *Paint Removers*

Solvent-based (e.g. methylene chloride) and alkaline paint strippers may be used to remove paints, coatings and graffiti from masonry.

##### iii. Mechanical/Abrasive Cleaning

Soiling and coatings may be removed from masonry by spraying, under pressure, substances which impact and abrade the masonry surface. While sandblasting is not recommended for cleaning masonry, the use of other blasting media, such as nut shells, pulverized corn cobs, glass beads, microballoons, rice hulls and baking soda, applied at an appropriate pressure for the type of masonry and its condition may be utilized to clean masonry. Abrasive cleaning should only be performed by qualified masonry restoration/cleaning contractors. Do not use metal brushes or scrapers, power sanders or grinders, or rotary drill attachments to clean masonry.

#### c. Guidelines for Developing a Masonry Cleaning Program

##### i. Always use the gentlest or least aggressive cleaning method(s) that will achieve satisfactory results without any detrimental effect on the masonry.

ii. In order to select an appropriate cleaning system, identify the type of masonry (granite, sandstone, limestone, brick, terra cotta, etc), assess the general condition of the masonry and identify the type of soiling – atmospheric dirt and pollutants, biological growth (algae, lichens, moss), paint/graffiti, metallic stains.

iii. Prior to execution, always test the considered cleaning methods. Initiate testing with the gentlest method to evaluate its effectiveness and to determine the acceptable level of cleanliness. Conduct tests on site in relatively small (at least 2 square feet) and inconspicuous areas that are representative of the soiling conditions.

iv. Do not sandblast masonry.

v. Do not use an open flame or blow torch to remove paints or coatings from masonry.

vi. Follow manufacturer’s instructions when using proprietary cleaning systems which are specifically formulated for masonry.

vii. Follow all safety precautions and disposal requirements, per manufacturer’s instructions.

Refer to:

*Preservation Brief 1: The Cleaning and Waterproof Coating of Masonry Buildings*, by Robert C. Mack

*Preservation Brief 6: Dangers of Abrasive Cleaning of Historic Buildings*, by Anne E. Grimmer.

*38: Removing Graffiti from Historic Masonry*, by Martin E. Weaver



d. *Masonry: Repointing*

Repointing is the removal and replacement of deteriorated mortar in a masonry wall. An appropriately formulated and applied repointing mortar will maintain the physical and visual integrity of the masonry. Improper formulation and application of repointing mortar, in addition to being unsightly, can cause irreparable damage to the masonry. Professionals experienced in working with historic masonry can provide guidance for appropriate repointing methods and materials.

- i. Prior to repointing, identify and rectify any conditions that may be causing deterioration of the mortar – such as leaking gutters and downspouts, rising damp or structural issues.
- ii. Carefully remove deteriorated mortar without damaging the adjacent masonry units or altering the original width of the joints. In some cases, hand-raking the joints may be the best method for removing mortar. Remove deteriorated mortar to a minimum depth that is 2-1/2 times the width of the joint.
- iii. The general rule for formulating an appropriate repointing mortar is that its ‘hardness’ in regard to compressive strength should not exceed the compressive strength of the masonry units or historic mortar. Excessively ‘hard’ or ‘strong’ mortars which contain a high percentage of portland cement may cause irreparable damage to the masonry units. Mortars must be formulated to accommodate stresses within a masonry wall caused by expansion, contraction, movement, settlement and moisture migration.
- iv. Traditional mortars generally consisted of hydrated lime and sand, although portland cement was widely used in mortars by the end of the 19th century. Modern materials recommended for repointing mortars shall conform to American Society for Testing Materials (ASTM) Standards, as indicated.

As a minimum standard, replacement mortar should consist primarily of one part lime (ASTM C-207, Type S) and 2 parts sand (ASTM C-144). In some cases, portland cement (ASTM C-150, Type II) can be included to improve workability and control color. Portland cement, however, should not exceed 20% of the combined volume of lime and cement.

- v. Laboratory analyses may be performed by specialty providers or testing facilities to identify the historic mortar’s constituents and their ratios within the mix, to assist building owners in developing appropriate repointing mortars.

- vi. When matching the color of historic mortar, the new mortar should match the color of unweathered, clean or interior portions of the mortar. Most early historic mortars were either white or a very light sand color. Late-nineteenth and early-twentieth century mortars were sometimes pigmented. If necessary, use alkali-proof mineral oxide pigments for masonry to achieve the proper color.
- vii. The use of anti-freeze compounds, bonding agents and air-entraining agents are generally discouraged in repointing mortars for historic masonry.

Refer to:

*Preservation Brief 2: Repointing Mortar Joints in Historic Masonry Buildings*, by Robert C. Mack, FAIA and John P. Speweik.

### 3. Metals

- a. General Maintenance
  - i. Maintain a protective paint finish on steel and cast and wrought iron. Maintain a protective paint finish on sheet steel or iron roofing, where original tin, terne or galvanized coatings have deteriorated.
  - ii. Prevent corrosion by galvanic action which occurs when dissimilar metals such as steel or iron and copper come into contact. Do not use these metals together or install plastic insulators where necessary.
  - iii. Severely corroded elements, structural failures, broken or failed joints and impact damage should be assessed by a preservation specialist to evaluate causes and determine appropriate remedial treatments.
- b. Cleaning and Paint Removal on Cast and Wrought Iron
  - a. Remove paint finishes and corrosion from cast and wrought iron with hand-scraping, wire-brushing or low-pressure grit blasting. Appropriate chemical strippers may also be utilized to remove paint finishes. Remove any soiling, grease or oil prior to painting. The metal surfaces must be dry before painting.
  - b. Using a brush, prime cast or wrought iron with an alkyd rust-inhibitive or zinc-rich primer. Latex or water-based paints are not recommended as primers.
  - c. Apply alkyd finish coats with a brush.

Refer to:

*Preservation Brief 17: The Maintenance and Repair of Cast Iron*, by John G. Waite, AIA.



## APPENDIX B: MAINTENANCE AND REHABILITATION

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### 4. Structural Glass

- a. General Maintenance
  - i. Provide adequate maintenance through the repair of cracked or open cement joints with tinted silicone compounds.
  - ii. If it is necessary to remove glass panels due to adhesive failure, commercial solvents should be used to dissolve the hardened mastic and allow the panels to be removed without damage.
  - iii. Glass panels should be reapplied to a clean surface with an asphalt mastic adhesive similar to the original, rather than silicone, butyl, rubber or epoxy products.
  - iv. Small repairs to structural glass panels can be made by using flexible caulk in a color that matches the historic glass.
  - v. When necessary to retain the window's structural integrity, reinforce the transom structure, if necessary, with low-profile steel bars mounted to the inside of the glass tiles.

Refer to:

*Preservation Brief 12: The Preservation of Historic Pigmented Structural Glass (Vitrolite and Carrara Glass)*

### 5. Paint

- a. General Maintenance
  - i. Keep existing painted materials well painted.
  - ii. Use a high-quality paint and follow the manufacturer's specifications for preparation and application.
  - iii. Cleaning painted surfaces of accumulated dirt on an annual basis will prolong the life of your paint job.
- b. Preparation for Painting
  - i. Remove loose and peeling paint down to the next sound layer using the gentlest means possible: hand-scraping and hand-sanding for wood and masonry, and wire brushes for metal.
    - Professional chemical removal of paint may be acceptable in certain situations and if performed by a contractor experienced in working on historic buildings.
    - Do not use sandblasting, open flames, or high-pressure water to remove paint from masonry, wood, or soft metals. The use of a blow torch or open flame, which can permanently damage wood surfaces, presents a fire hazard and may also release toxic lead fumes.
    - Follow all local environmental regulations for the use and disposal of paints and paint residue.
  - ii. Properly prepare all surfaces, so that they are free of dirt, grease or oil prior to painting.

- iii. Prime surfaces, if wood or metal is exposed. Prime wood and metal surfaces to ensure compatibility between different types of paint and to enhance adhesion.
  - Do not apply latex or water-based paint directly over oil-based paint without proper surface preparation and a primer intended for such use as it will not properly adhere to the oil-based layer and will ultimately fail.
  - Use proper metal primers when painting metal.

Refer to:

*Preservation Brief 10: Exterior Paint Problems on Historic Woodwork*, by Kay D. Weeks and David W. Look, AIA.

### 6. Foundations

- a. General Maintenance
  - i. Ensure that land is graded so that water flows away from the foundation; and, if necessary, install drains around the foundation.
  - ii. Remove any vegetation that may cause structural disturbances at the foundation.
  - iii. Keep crawl space vents open so that air flows freely.

### 7. Gutters and Downspouts

- a. General Maintenance
  - i. Check gutters on a regular schedule to avoid clogging which can lead to moisture damage.
  - ii. Inspect building surface for moisture penetration.

### 8. Windows

- a. General Maintenance
  - i. Ensure that all hardware is in good operating condition.
  - ii. Ensure that caulk, glazing putty and finishes are intact and that water drains off the sills.
  - iii. See Storm Windows, Storm Doors, and Thermal Efficiency, *Chapter V: Section F* for steps to take to improve the performance of existing windows.

Refer to:

*Preservation Brief 9: The Repair of Historic Wooden Windows*, by John H. Myers.

### 9. Storefronts

- a. General Maintenance
  - i. Maintain paint on wood surfaces and use appropriate paint placement to enhance the inherent design of the building. See *Chapter VI: Section F* for recommendations on proper paint placement for storefronts.



### PREVENTATIVE AND CYCLICAL MAINTENANCE CHECKLIST

Proper maintenance of a building includes periodic inspections to identify problems before they cause significant damage. Regular maintenance will stop any deterioration already begun and provide an easy and less expensive way to maintain the physical condition of your building. It is a good idea to keep documentation of yearly maintenance for present and future homeowners.

Perform this maintenance check once each year, preferably after a moderate rainfall.

### ROOF

#### What to look for...

- Materials:** Is there warping, severe wear, cracking, lumps, curling, decay, splitting, rusting, loose pieces, missing pieces, broken pieces, thin material?
- Structure:** Is the roof level, or does it sag?
- Roof flashing, Gutters, Downspouts:** Is there rusting, paint loss, sagging, missing, or torn pieces, blockages, poor drainage?
- Decorative elements (finials, snow breaks, cresting, etc.):** Are there loose pieces, rust, missing pieces, deteriorated cornice?
- Chimney or parapet:** Is the chimney sagging, leaning, or bowing? Are the mortar joints tight? Is the chimney cap rusting or missing? Are bricks loose or missing?

#### Estimated Life Span and Repairs Required

1. Metal roofing: repair and paint every 5-10 years. Others: 20-50 years.
2. Repair and repaint other roof materials every 5-10 years.
3. Pointing should last 50 years or more.

### EXTERIOR WALLS

#### What to look for...

- Structure:** Are the walls leaning, bowing, bulging? Are cracks evident? Are the door and window openings square?
- Materials:** Is the surface of masonry or stucco flaking, crumbling, or are units missing? Is the mortar loose or crumbling? Is the wood siding cracked, loose, rotted, or split? Do courses of siding appear straight or wavy? Is cast iron or pressed metal rusting, pitted, or missing? Are the walls stained? Is paint peeling, cracking, blistering, or chalking?
- Porch floors:** Are there cracks, splits, loose boards, missing boards, rot?
- Decorative elements:** Is there peeling paint, cracks, or loose pieces?



## APPENDIX B: MAINTENANCE AND REHABILITATION

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### EXTERIOR WALLS (CONT'D)

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#### Estimated Life Span and Repairs Required

1. Dry, properly maintained wall structure should last indefinitely.
2. Masonry units can last for centuries with proper maintenance.
3. Pointing should last 50 years or more.
4. Replace clapboards that are beyond repair (estimated life span 150 years with proper maintenance).
5. Painted surfaces may require repainting every 5-10 years.
6. Paint previously painted masonry surfaces approximately every 10 years.
7. Wood floorboards should last 50 years or more.

### WINDOWS AND DOORS

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#### What to look for...

- Operation:** Do windows and doors open and close smoothly?
- Glass:** Is the glass broken? Is the glazing secure? Do the glass panes fit securely? Are the stops and putty secure?
- Frames, etc.:** Do the frame, muntins, sash, and door show signs of rust, rot, or insect damage? Is the threshold rotted? Are there open joints around the frames and trim?
- Hardware:** Is the hardware operational and in good repair?
- Weatherization:** Is the weather stripping in good repair? Do storm windows fit tightly? Are the screens damaged?

#### Estimated Life Span and Repairs Required

1. Windows should last 100 years or more.
2. Repaint every 5-8 years, as necessary depending on weathering.
3. Window glass should last indefinitely.
4. Hardware, properly treated, should last indefinitely.
5. Putty should last 10-15 years.
6. Caulking should last 15-20 years.



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## EXTERIOR FEATURES

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### What to look for...

- Exterior Elements:** Are porches, stairs, railings, cornices, brackets and other exterior features in good repair? Are elements missing?
- Paint:** Is the paint cracked, faded, or peeling?

### Estimated Life Span and Repairs Required

1. Repaint every 5-10 years, depending on surface and conditions.

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## FOUNDATION

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### What to look for...

- Masonry:** Does water drain away from the foundation? Is masonry flaking, crumbling, spalling, cracking? Is masonry loose or missing? Is the mortar secure?
- Structure:** Is the wall bulging or bowing?
- Vegetation:** Are algae, moss, vines growing on the foundation?
- Water Control:** Do downspouts have splash blocks?

### Estimated Life Span and Repairs Required

1. Properly maintained masonry should last indefinitely.
2. Pointing should last 50 years or more.