



Wood is a traditional building material that can be repaired and strengthened over time to withstand weather events. (www.loc.gov)

# R4 RESILIENCE GUIDANCE: EXTERIOR WOOD

## EXTERIOR WOOD IMPROVEMENT GOALS

*Wood is a naturally resilient material if maintained regularly. Framing elements can absorb low levels of vibrations and wind pressure and can dry out from rain and flood events. The key to good maintenance is routine painting and localized treatment of any signs of deterioration.*

## MAINTENANCE AND PERMITTING

A building permit may be required for any of these suggested work items. (Refer to Resilience Guidance: Permit Review, page R1.5.) Also, if the property is subject to review by the Board of Architectural Review or Design Review Board, additional reviews may be required. For any questions or concerns, contact the Permit Center. Additional resources and codes can be found on the last page of this topic section.

Wood is a relatively available, adaptable, and economical building material that can be used for structural framing. Most of Charleston's small-scale buildings have exterior wood elements. In masonry buildings, exterior wood elements may be limited to windows and doors. However, many of Charleston's most notable as well as humble buildings include wood cladding, trim, decorative features, and porches or piazzas. Some of the resilient features and vulnerabilities of wood elements are identified below.

- **Cladding:** Wood cladding includes horizontal siding or shingles mounted to a wall. Cladding can direct water to shed off and away from the building and deflect wind and water. Gaps in cladding can allow stormwater and air to enter wall cavities, and the exterior color can affect the amount of heat absorbed into the building.
- **Trim:** Wood trim is used to cover seams and gaps preventing stormwater and air infiltration. It can also be a decorative element that adds to the building style.
- **Porches and Piazzas:** Based on the location, a porch or a piazza can protect an entrance area from water, shade windows and walls, and provide an outdoor area shielded from the sun and rain. However, they are also vulnerable to uplift in severe winds and toppling in earthquakes.

***One of the best ways to improve resilience for wood elements is regular maintenance.*** Wood building elements are vulnerable to deterioration from water exposure, fungus, mold, and insects. Deterioration can impact the stability of the wood element as well as the tightness of nail and screw connections. ***Regular small or incremental repairs can greatly extend the life a wood element and improve the overall resilience of a building.***





All wood surface elements and details should be securely fastened, regularly repainted, and monitored for rot to increase resistance to natural hazards.

## GENERAL MAINTENANCE OF EXTERIOR WOOD

Exterior woodwork adds important details that can distinguish one building from another, and should be preserved regardless of the building age or style. Care should be taken when looking for potential problems with wood elements since the extent and cause of damage may not be immediately apparent. **Severe problems may have an unattractive appearance. Peeling paint or missing details can be cosmetic, or a sign of a more significant problem, like rot.** Wood-destroying organisms like termites may be less noticeable and will require more detailed inspections and treatment. Masking any of these conditions can result in more expansive and expensive future repairs.

Old-growth wood, like heart pine and cypress found in historic buildings, is more resilient than treated pine or new growth cypress. Depending on rain, wind, and sun exposure, new-growth woods and siding materials may need routine treatment to extend their life cycle. Selective repair or replacement of damaged parts and a regular maintenance program will improve resilience.

### KEY TIPS:

- Conduct semi-annual inspections of all exterior wood elements to verify condition and determine maintenance needs; signs of deterioration include peeling paint and veins of dirt near the ground indicating termite activity
- Clean exterior surfaces annually in warm weather with a garden hose, household detergent, and a bristle brush
- Maintain exterior woodwork on a regular basis, repainting every 5-8 years
- Engage a pest management service to minimize termite and pest infestations
- Repair smaller areas of damage before deterioration spreads
- Selectively replace deteriorated elements when they are beyond repair, matching the original whenever possible



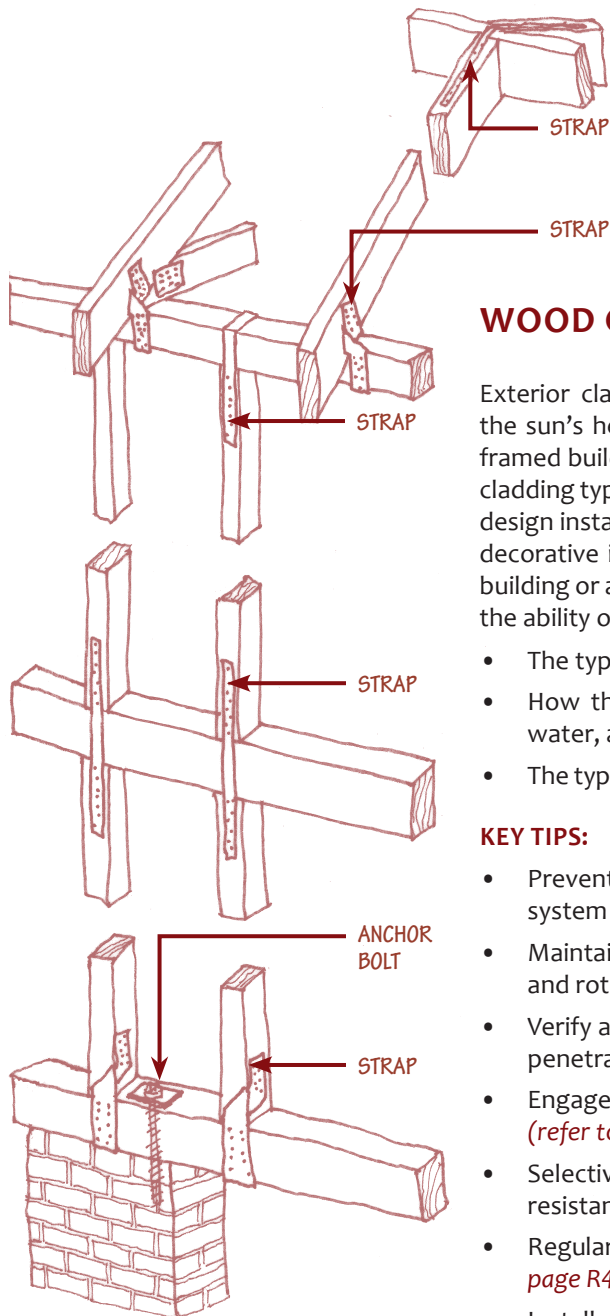
Removal of original siding should be limited because old-growth wood is dense and more decay resistant.



Paint can deteriorate over time or be an indicator of underlying problems that show as wrinkling, peeling, blistering, cracking or crazing, or alligatoring.



Wood that is in contact with the ground, situated close to plants, or in areas prone to splashing water are particularly vulnerable to rot and must be regularly cleaned and painted.



## PEST MANAGEMENT SERVICES

Termite management should be handled by a qualified company. They can regularly check the property and be available when infestation treatment is required, such as the application of boric acid or termite shields. Pest management companies can also address other pests including carpenter ants and bees, as well as nesting animals.

## WOOD CLADDING

Exterior cladding acts as the exterior skin of a building, repelling water and the sun's heat. The exterior cladding can also increase the rigidity of a wood-framed building, improving its ability to withstand earthquake vibrations. Wood cladding types include clapboard, weatherboard, tongue and groove, or a shiplap design installed as individual, overlapping boards. Less frequently, square cut or decorative individual wood shingles were used as cladding, either on an entire building or as a decorative feature on a prominent gable end. Factors influencing the ability of wood cladding to serve as a resilient "skin" include:

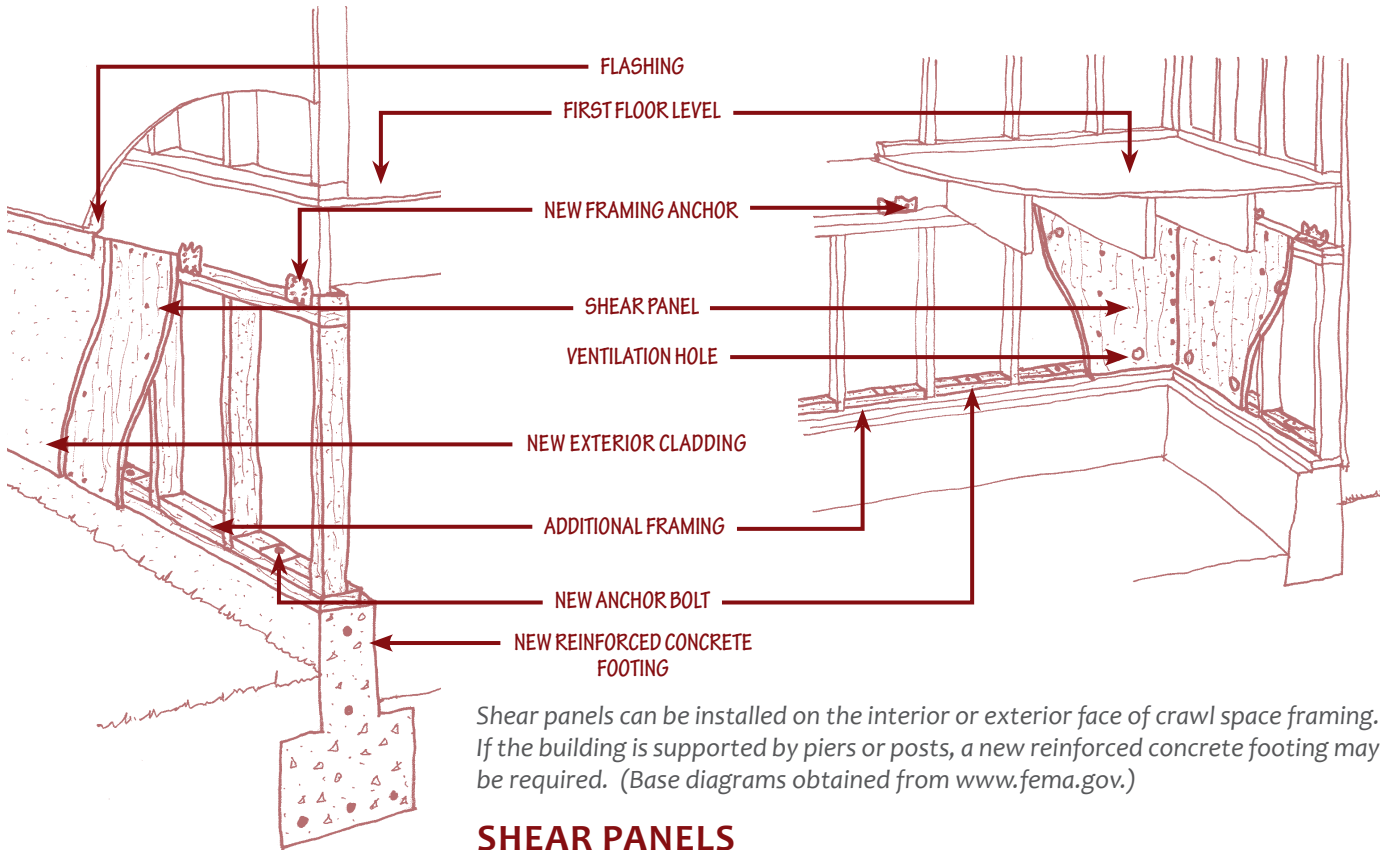
- The type and condition of the wood and wood substitute
- How the walls and its parts are assembled, whether the assembly sheds water, and the tightness of the joints
- The type and condition of fasteners, such as nails, screws, hangers, and straps

### KEY TIPS:

- Prevent gaps or openings that can allow stormwater or wind to enter to wall system
- Maintain and make repairs to cladding as needed to reduce deterioration and rot that ultimately requires replacement of large areas of exterior siding
- Verify all layers of siding are secured to limit damage from strong winds and penetration from wind-driven rain
- Engage a pest management service to minimize termite and pest infestations (*refer to Pest Management Services, sidebar above*)
- Selectively replace flood-damaged cladding with visually similar water resistant or composite materials (*refer to FEMA Technical Bulletin 2*)
- Regularly repaint cladding to protect outside surface (*refer to Exterior Paint, page R4.7*)
- Install anchor bolts, cross braces, and hurricane straps to improve hurricane and earthquake resilience if there is access to the wall framing (*refer to diagram at left and Shear Panels, page R4.4*)
- Install tension anchors from masonry walls to roof and floor framing
- Obtain a pressure test and/or an infrared test to identify areas that can be improved to reduce interior heat loss or gain
- Upgrade or install new wall insulation with appropriate breathable membrane; avoid moisture barriers that may promote rot (*refer to Insulation Matrix, page R8.6*)
- If the exterior siding is removed at non-historic buildings consider air barriers as well as impact and water-resistant materials like fiber-cement products

If the framing is exposed, it can be reinforced with hurricane straps to increase the resistance to wind uplift. Exposed framing also provides the opportunity to add exterior plywood shear panels to improve rigidity in addition to building insulation and an air barrier to improve heat loss or gain.





## SHEAR PANELS



Shear panels can be installed on outside walls when siding is being replaced.

Shear panels and walls can greatly improve the resilience of a wood-framed structure by resisting racking from earthquakes and high winds. Wood-framed structures are very susceptible to seismic damage. Many wood-framed buildings are constructed using nails as fasteners. The back and forth shaking of a structure can weaken connections and cause a structure to rack (tilt) or portions of a structure to collapse. A shear panel, typically made from plywood or similar rigid material, can be fastened to the interior or exterior face of wood-framed wall studs. The shear panels act as a diaphragm, making a framed wall perform more like a solid structural element than a series of individual studs. The flat surface of the shear wall can also reduce the amount of airflow through wood siding and provide a continuous surface on which to install an air barrier.

### KEY TIPS:

- If the exterior siding is removed, install shear panels to the outside walls to increase building rigidity (*refer to Historic Preservation Considerations, page R4.8*)
- Install shear panels to the exterior or interior face of exterior wood studs in crawlspaces and between wood porch or piazza supports to increase building rigidity; a continuous concrete foundation and flood openings may be required if the building is in the Special Flood Hazard Area (*refer to Flood Openings, page R5.8*)
- Install shear panels on the interior of garage walls, particularly if there is living space above the garage; additional support will be required around garage door opening (*refer to Garage Door Wind Protection, sidebar page R6.9*)



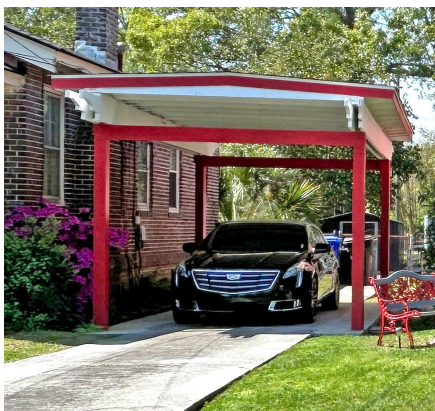
Trim pieces may appear as monolithic, solid features, however they are usually made up of many pieces.

## WOOD TRIM

Running trim details can be found at transitions between materials or where they change direction, such as the roof lines or eaves, window and door frames, and corner boards. Decorative trim can serve similar functional purposes, while adding character to the building. Deteriorating wood trim provides a pathway for stormwater and wind to penetrate into exterior walls, eventually causing damage to structural elements. Trim details may have sufficient weight to cause damage or physical harm if they are dislodged.

### KEY TIPS:

- Maintain the protective paint or stain finish (*refer to Exterior Paint, page R4.7*)
- Maintain caulk joints between different materials and changes in direction to prevent stormwater and air infiltration (*refer to Weatherstripping and Caulk, page R6.8*)
- Refasten trim pieces as needed and address repairs with wood filler, epoxy consolidation, or Dutchman (*refer to Wood Rot Repair, page R4.7*)
- Ensure any newly added trim is securely anchored to the building structure



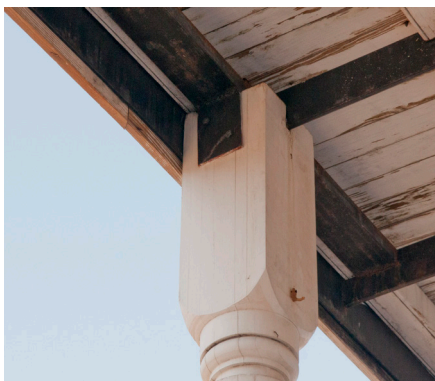
Connections for carports, attached or detached, should be evaluated for improvements to reduce wind damage.

## WOOD PORCHES AND PIAZZAS

Porches and piazzas tend to be constructed with wood elements, whether the building is a masonry or wood-framed structure. Traditionally, they were designed to resist gravity loads, and not uplift or lateral loads. Since they project from the main structure, they are more vulnerable to damage from high winds and earthquakes, as are carports and raised decks. However, they provide beneficial shade and stormwater protection. Maintaining, fortifying, or constructing a new porch or piazza can increase the resilience of the main building structure. (*Refer to Historic Preservation Considerations, page R4.8.*)

### KEY TIPS:

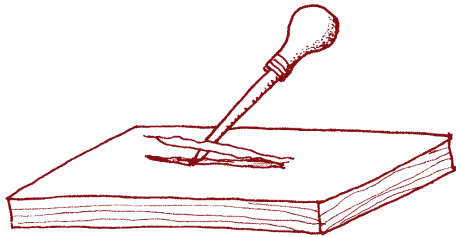
- Maintain steps, columns, posts, railings, and roofs to increase the longevity of the porch or piazza
- Maintain fasteners to prevent components from dislodging in high winds
- Ensure that any nearby plants or attached planters are not draining water toward the porch or contributing to biological growth on wood surfaces
- Avoid using the space as a storage area where items are subject to open winds and rain
- Maintain gutters and downspout systems to direct heavy rain away from the porch or piazza (*refer to Gutters and Downspouts, page R3.4*)
- Confirm decking, roofing, and horizontal rails are angled to shed water
- Install new porches or piazzas on south and west sides of a building in a manner that shades walls, windows, and doors
- Install hurricane-rated fasteners to tie columns and posts to the roof and foundation structures to strengthen their resistance against wind uplift and lateral earthquake forces (*refer to diagram, page R4.3*)
- Retain an architect or engineer to determine whether additional lateral support bracing is needed for wide openings



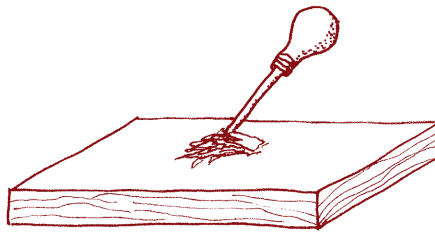
This traditional iron post connection could be replaced with a hurricane-rated connector.

## WOOD ROT

Evaluating wood splinters can help determine if wood is healthy or rotted.



Less penetration and long splinters are an indication of healthy wood.



Greater penetration and short splinters are possible indication of rot.

### DECAY RESISTANT WOOD

When making large repairs or constructing new features consider using a decay-resistant wood:

- Mahogany
- Redwood
- Air-dried, pressure-treated, southern yellow pine; select grade for installation location, C and BRT (Better) for exposed siding and trim (proper preparation is required for paint to adhere)

### WOOD ROT MATRIX

ROT SOURCE	OBSERVATIONS	REMEDIES
<b>Groundwater</b>	Soil is moist or water is pooling near building elements that is transferring moisture to other parts of the building	<ul style="list-style-type: none"> <li><input type="checkbox"/> Eliminate direct contact between wood and soil</li> <li><input type="checkbox"/> Change site grading to direct water away from the building</li> <li><input type="checkbox"/> Remove or trim back vegetation close to the building</li> <li><input type="checkbox"/> Install a damp-proof barrier to stop rising damp</li> </ul>
<b>Precipitation (rain)</b>	Heavy rains, wind driven rain, and flooding can push water into small openings and trap moisture in wall cavities	<ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure that small openings and crevices are sealed with caulk and the surface is entirely painted</li> <li><input type="checkbox"/> Clear out gutters and ensure they are properly sized</li> <li><input type="checkbox"/> Direct rainwater away from the building to avoid splashing</li> </ul>
<b>Leaky Plumbing</b>	Cracked pipes or slow leaks develop around water sources and appliances	<ul style="list-style-type: none"> <li><input type="checkbox"/> Seal any cracks in grout and tiles on floors and around tubs, sinks, washing machines, and dishwashers</li> <li><input type="checkbox"/> Routinely inspect for leaks where plumbing is accessible behind the walls, around washing machines, and dishwashers</li> </ul>
<b>Condensation</b>	Warm moist air comes in to contact with a cold surface that is below the dew point temperature, causing excess moisture to change to water droplets on a cold surface	<ul style="list-style-type: none"> <li><input type="checkbox"/> Install exhaust fans in kitchens, bathrooms, and laundries</li> <li><input type="checkbox"/> Insulate water pipes to avoid shocks from temperatures</li> <li><input type="checkbox"/> Place a layer of plastic sheathing on the ground in the crawlspace to limit condensation on wood sills and joists</li> <li><input type="checkbox"/> Install insulation at exterior walls without a vapor barrier (<i>refer to Insulation Matrix, page R8.6</i>)</li> <li><input type="checkbox"/> Paint interior walls</li> <li><input type="checkbox"/> Install a dehumidifier</li> <li><input type="checkbox"/> Ensure that condensation from window or wall air conditioning units is not dripping onto wood or pooling near building walls and windows</li> <li><input type="checkbox"/> Insulate all internal HVAC coolant lines and drain lines</li> <li><input type="checkbox"/> Ensure HVAC units are well sealed and do not excessively leak air</li> <li><input type="checkbox"/> Maintain air conditioning at design set temperature</li> </ul>
<b>Termites</b>	Swarms are rarely observed but residual evidence of their colony include detached wings, excrement, mud tubes, or cartons (nests)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Contract with a qualified pest control company to:                             <ul style="list-style-type: none"> <li>• Apply a termiticide as a soil treatment</li> <li>• Install termite bait stations</li> <li>• Perform a complete fumigation (tenting)</li> <li>• Treat infested trees</li> </ul> </li> </ul>



Deteriorated and rotted wood can be carved out.



Epoxy has been applied to match the profile of the existing trim.



After painting, the repaired area is difficult to distinguish from the wood.

## WOOD ROT REPAIR

If a portion of an exterior element is deteriorated beyond repair, it is often possible to replace only the deteriorated sections and not the entire component or unit.

**Applying and maintaining a good coat of paint after repairs to add a layer of protection to limits moisture infiltration and damage from the sun, pests, and other forms of deterioration.** (Refer to Exterior Paint, below.)

### WOOD ROT REPAIR TYPES

There are two traditional means to repair wood elements:

- **Epoxy consolidation:** Insertion of penetrating liquid epoxy into porous wood, generally by injection through small, drilled holes. As the epoxy dries it hardens and strengthens the deteriorated wood.
- **Dutchman:** In-kind replacement of deteriorated portion of wood, not necessarily the entire element.



Painting is a continuous maintenance need for exterior wood surfaces.

## EXTERIOR PAINT

Paint is one of the best ways to protect exterior materials from the elements, particularly wood without natural or chemical preservatives. Exterior paint provides a layer of protection to a building by adding a barrier that limits moisture infiltration, damage from the sun, pest infestation, and other forms of deterioration. To a lesser degree, it also provides a “skin” that reduces air flow into a building when combined with sealant in gaps and openings. (Refer to Weatherstripping and Caulk, page R6.8.)

### KEY TIPS:

- Repaint exterior woodwork every 5-8 years to reduce damage from water, the sun, and pests
- Wash painted surfaces annually to remove dirt and mildew, extending the life of the paint and improving the appearance (refer to General Maintenance of Exterior Wood, page R4.2)
- Consult with a paint specialist to select the appropriate paint for the conditions: oil paint, often found on older buildings, tends to adhere better to problem surfaces; several layers of latex paint can form an unintended impermeable moisture barrier and its surface tension can pull underlying paint layers from substrate
- For the best long-term results, prepare surface and apply primer and paint in accordance with paint manufacturer’s recommendations
- Repair deteriorated areas and underlying causes prior to repainting
- Select light-colored paint for exterior wall surfaces to reflect the sun’s heat, reducing interior heat gain

### LEAD PAINT

Paint dust from older buildings may contain lead. Recommendations when disturbing paint surfaces:

- Keep children and pets away
- Wear a ventilator
- Avoid open food and beverage containers
- Thoroughly clean exposed skin and launder work clothes





A few buildings in the historic district feature wrought or cast iron detailing in balconies or galleries, that should be retained and preserved to the extent possible. (Refer to NPS Preservation Brief 27: *The Maintenance and Repair of Architectural Cast Iron* for additional resources.)

## HISTORIC PRESERVATION CONSIDERATIONS

Properties located in a historic district or design review district may require additional City review whether a permit is required or not. Contact the Permit Center, or the BAR or DRB staff, to speak with someone directly and use Preservation Briefs for guidance. (Refer to Resources, page R4.12.) Information is provided below for best practices toward maintaining the historic character of a property when changes are made to exterior wood elements.

### GENERAL MAINTENANCE

- Retain and maintain existing exterior woodwork including siding, shingles, trim, and ornament
- Stucco, brick, and stone veneer should not be applied on buildings that traditionally had wood siding

### REPAIR OR REPLACEMENT

- Replace only the original elements that cannot be repaired using elements of the same material, size, profile, and other visual characteristics; wholesale replacement of historic siding or trim is discouraged and rarely warranted
- Replace missing or deteriorated materials with salvaged materials or similar new materials
- Retain balustrades, adding a secondary rail if required for code purposes
- When replacing siding it might be necessary to install temporary bracing to prevent racking of the structure in high winds or an earthquake
- Changes in siding materials and characteristics should correspond with natural breaks in buildings such as corner boards

### BAR

Refer to the BAR Jurisdiction Chart and Map or speak with City staff to determine if a property has additional permit or review requirements.

BAR Policy Statements:

- *Use of Mechanical Tools*
- *Piazza Enclosures*
- *Historic Materials Demolition*
- *Elevation Design Guidelines*





Devastation was widespread when Hurricane Hugo made landfall nearby. Some property owners may choose to pursue larger mitigation projects that could impact piazzas or porches and historic building access points. (SC Department of Natural Resources)

## HISTORIC PRESERVATION CONSIDERATIONS (CONTINUED)

### PAINT

- Paint wood in a color and finish to complement the architectural characteristics
- Use caution around paint dust from an old building as it may contain lead (refer to *Lead Paint*, sidebar page R4.7)

### FLOOD, HURRICANE, OR SEISMIC RETROFITS

- Strengthen soffits, overhangs, and vents at the connections between the roof and wall framing in a manner that minimizes visibility
- Design exterior reinforcements, when necessary, to avoid obscuring the historic material or decorative details
- Paint any new exterior vents, soffits, and reinforcement materials to blend with adjacent wall or trim colors
- Install hurricane-rated straps on to the tops and bottoms of vertical posts and columns; consult an architect or engineer for specific guidance (historic columns and posts do not always have fasteners at the top and bottom)
- Anchor the bottoms of columns and posts to the ground with masonry or concrete footers
- Extend stairs in building elevation projects in a manner that maintains historic alignments and relationship with the entrance door to the extent possible
- Align extended piers with vertical elements such as porch columns or posts and corners of stair landings
- Install screening to visually minimize porch piers, stair supports, and ramps
- Install railings that are compatible with the historic building type and style
- Minimize visual impacts of accessible elevators or lifts

## EXTERIOR WOOD IMPROVEMENT CHECKLIST

The Exterior Wood Improvement Checklist on the following pages identifies maintenance information and related potential resilience improvements. Information on the relative costs, expertise, and vulnerabilities addressed are keyed with icons described at right.

**Level of Risk and Professional Help:** The Checklist identifies work that can be completed by property owners or tenants who are able to safely and comfortably use hand tools or power equipment, as needed. Any lifting, bending, or exertion beyond a person's abilities should be undertaken by professionals.

**Vulnerabilities:** The icons below are used throughout this guide. Completion of the proposed improvements can increase a building's resilience from the following vulnerabilities:















-  Flood
-  Wind
-  Earthquake
-  Heat
-  Good maintenance

















**Cost:** The relative cost of the proposed improvement is denoted by symbols below. The cost will vary based on the conditions and extent of the impacted area.

- ¢ Minimal supplies under \$100
- \$ \$100-\$1,000
- \$\$ \$1,000-\$5,000
- \$\$\$ \$5,000 and above

**“Off-the-Shelf” Solution Available:** An item that is relatively available for purchase and easy to install by a property owner or contractor.

EXTERIOR WOOD IMPROVEMENT CHECKLIST

<p><b>ACTION / PROJECT</b></p> <p><i>PERMITS: A building permit may be required for any of these suggested work items. Additionally, if the property is subject to review by the Board of Architectural Review or Design Review Board, additional reviews may be required. For any questions or concerns, contact the Permit Center.</i></p>	RESILIENCE BENEFIT	COST	DO-IT-YOURSELF	CONTRACTOR MAY BE REQUIRED	ARCHITECT OR ENGINEER MAY BE REQUIRED	"OFF-THE-SHELF" SOLUTION AVAILABLE
<p><b>GENERAL MAINTENANCE OF EXTERIOR WOOD</b> <span style="float: right;">Page R4.2</span></p>						
<input type="checkbox"/> Clean exterior surfaces annually in warm weather with a garden hose, household detergent, and a bristle brush		¢-\$	●	●		
<input type="checkbox"/> Maintain exterior woodwork on a regular basis		\$-\$\$	●	●		
<input type="checkbox"/> Repair smaller areas of deterioration before deterioration spreads		¢-\$\$	●	●		
<input type="checkbox"/> Selectively replace deteriorated elements when they are beyond repair, matching the original whenever possible		¢-\$\$	●	●	●	
<p><b>WOOD CLADDING</b> <span style="float: right;">Page R4.3</span></p>						
<input type="checkbox"/> Prevent gaps or openings that can allow stormwater or wind to enter		\$-\$\$	●	●		
<input type="checkbox"/> Maintain and make repairs to reduce loss from deterioration and rot		\$-\$\$\$	●	●		
<input type="checkbox"/> Secure all layers of siding that may have been added over time		\$-\$\$	●			
<input type="checkbox"/> Engage a pest management service		\$		●		
<input type="checkbox"/> Selectively replace flood-damaged cladding with visually similar water resistant or composite materials at non-historic buildings		\$-\$\$		●		
<input type="checkbox"/> Install anchor bolts, cross braces, and hurricane straps		\$\$-\$\$\$		●	●	
<input type="checkbox"/> Install tension anchors from masonry walls to roof and floor framing		\$\$-\$\$\$		●	●	
<input type="checkbox"/> Obtain a pressure test and/or an infrared test to identify areas needing improvements		\$		●		
<input type="checkbox"/> Upgrade or install new wall insulation with appropriate breathable air barrier		\$\$-\$\$\$	●	●	●	
<input type="checkbox"/> If the exterior siding is removed of a non-historic building, consider impact and water resistant materials		\$-\$\$\$		●	●	

<b>ACTION / PROJECT</b> <i>PERMITS: A building permit may be required for any of these suggested work items. Additionally, if the property is subject to review by the Board of Architectural Review or Design Review Board, additional reviews may be required. For any questions or concerns, contact the Permit Center.</i>	RESILIENCE BENEFIT	COST	DO-IT-YOURSELF	CONTRACTOR MAY BE REQUIRED	ARCHITECT OR ENGINEER MAY BE REQUIRED	"OFF-THE-SHELF" SOLUTION AVAILABLE
<b>SHEAR PANELS</b> <span style="float: right;">Page R4.4</span>						
<input type="checkbox"/> If the exterior siding requires removal, install shear panels to exterior wall framing		\$\$\$\$		●	●	
<input type="checkbox"/> Install shear panels at inside face of exterior wood studs, in crawlspaces, and between porch or piazza supports		\$\$\$\$	●	●	●	
<input type="checkbox"/> Install shear panels inside garage walls		\$\$\$\$	●	●	●	
<b>WOOD TRIM</b> <span style="float: right;">Page R4.5</span>						
<input type="checkbox"/> Maintain caulk joints between different materials and at material edges		C-\$\$	●			●
<input type="checkbox"/> Refasten loose or dislodged trim pieces		C-\$\$	●	●		
<input type="checkbox"/> Ensure any newly added trim is securely fastened to the building		C-\$\$	●	●		
<b>WOOD PORCHES AND PIAZZAS</b> <span style="float: right;">Page R4.5</span>						
<input type="checkbox"/> Maintain fasteners and steps, columns, posts, railings, roofs that are exposed to the weather		C-\$	●	●		
<input type="checkbox"/> Ensure that any nearby plants are not causing water damage or biological growth		C	●			
<input type="checkbox"/> Maintain gutters and downspout systems and direct stormwater away from building foundation		C-\$	●	●		
<input type="checkbox"/> Construct or alter decking, roofing, and horizontal rails at an angle to shed water		\$\$\$\$	●	●	●	
<input type="checkbox"/> Install new porches or piazzas on south and west sides of a building to maximize shade		\$\$-\$\$\$\$		●	●	
<input type="checkbox"/> Install hurricane-rated fasteners to tie down the roof and secure columns and posts to foundations to improve resilience to high winds and earthquakes		\$\$-\$\$\$\$		●	●	
<input type="checkbox"/> Consider additional bracing or shear walls for porches that span wide spaces		\$\$-\$\$\$\$		●	●	
<b>EXTERIOR PAINT</b> <span style="float: right;">Page R4.7</span>						
<input type="checkbox"/> Repaint exterior wood every 5-8 years		\$\$\$\$	●			
<input type="checkbox"/> Repair deteriorated areas and underlying problems prior to repainting		\$\$\$\$	●	●		
<input type="checkbox"/> Select light-colored paint for exterior wall surfaces to minimize heat gain		\$\$\$\$	●			

## EXTERIOR WOODWORK RESOURCES

### Federal Emergency Management Administration (FEMA)

Earthquake Safety at Home, FEMA P-530

Flood Damage-Resistant Materials Requirements, Technical Bulletin 2

Wind Retrofit Guide for Residential Buildings, FEMA P-804

[fema.gov](https://www.fema.gov)

### Historic England

Repairing Walls of an Older Home

[historicengland.org.uk](https://www.historicengland.org.uk)

### National Park Service

Preservation Brief 10: Exterior Paint Problems

Preservation Brief 11: Rehabilitating Historic Storefronts

Preservation Brief 16: The Use of Substitute Materials on Historic Exteriors

Preservation Brief 27: The Maintenance and Repair of Architectural Cast Iron

Preservation Brief 41: The Seismic Rehabilitation of Historic Buildings

Preservation Brief 45: Preserving Historic Wood Porches

[nps.gov](https://www.nps.gov)

### Old House Journal

Epoxies for Wood Repair

7 Insulation Tips to Save Money and Energy

[oldhouseonline.com/repairs-and-how-to](https://www.oldhouseonline.com/repairs-and-how-to)

### U.S. Department of Energy

Adding Insulation to an Existing Home

Finding and Selecting an Energy Assessor

[energy.gov](https://www.energy.gov)

### U.S. Department of Environmental Protection

Lead Abatement, Inspection and Risk Assessment

Lead Renovation, Repair and Painting Program

[epa.gov](https://www.epa.gov)



### REGULATIONS TO REVIEW

- International Existing Building Code
- ASCE 24-14 Flood Resistant Design and Construction
- South Carolina Building Code
- South Carolina Residential Code
- City of Charleston Code of Ordinances
- City of Charleston Flood Hazard Prevention and Control Ordinance

*This is not a comprehensive list and is intended only to provide additional resources to consider when planning a project. Contact the Permit Center for detailed information.*

**City of Charleston Permit Center**  
2 George Street, Ground Floor  
Charleston, SC 29401  
843.577.5550  
[permits@charleston-sc.gov](mailto:permits@charleston-sc.gov)