

SECTION 08 01 52

WOOD WINDOW REPAIRS

PART 1 GENERAL

1.1 SUMMARY

- A. Historic windows: Existing materials shall be reused whenever possible in the repair of historic wood windows. This includes all wood elements and original hardware. Replacement of window elements with new material shall be done only when historic elements are so deteriorated as to prohibit their useful function.
- B. Restoration of existing wood window units, including selective dismantling; stripping of existing paint; repair or replacement of deteriorated wood components; fabrication of new components (including complete window sash and frames) to replace missing or severely deteriorated window components; repainting wood surfaces; installing new glass; and reinstalling wood window sash, rebalancing and adjusting operation as needed. Salvage all existing counterweights, pulleys, hinges, and other hardware necessary to enable installation, and provide replica hardware as needed.
- C. Related Sections include the following:
 - 1. Section 07 92 00 - Joint Sealants
 - 2. Section 08 80 10 - Glass and Glazing

1.2 REFERENCES

- A. The Secretary of the Interior's Treatment for Historic Properties
- B. U.S. Department of the Interior Preservation Briefs 9: *The Repair of Historic Wooden Windows*
- C. American Architectural Manufacturers Association (AAMA)
 - 1. 501.2 – Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
- D. Code of Federal Regulations: 29 CFR 1910.1000-1500, Subpart Z, "Toxic and Hazardous Substances"
- E. Glazing Publications: Comply with published recommendation of glass manufacturers and GANA's *Glazing Manual* unless more stringent requirements are indicated.
- F. Architectural Woodwork Institute: Comply with applicable requirements in AWI's *Architectural Woodwork Standards* for construction, finishes, grades of wood windows, and other requirements.

1.3 EXISTING WINDOW SYSTEM DESCRIPTIONS

- A. Hazardous Materials: Previous studies have identified some locations of existing lead-based paint, asbestos-containing materials, and other potentially hazardous materials. The intent of

the Project is to remove all hazardous materials from the site and to dispose of the materials properly.

- B. Window System Component Descriptions: Window component terminology shall be as identified in *Preservation Briefs 9: The Repair of Historic Wooden Windows*.
- C. Typical wood window systems for historic treatment work are twenty-one double-hung window units.

1.4 SUBMITTALS

- A. Product data: Manufacturer's product literature, technical data, and MSDS for each product indicated. Include product description, application procedures, precautions, limitations in use of products, and test reports and certifications substantiating that products comply with requirements.
- B. Work Plan: Submit a written plan describing the sequence, means, materials, and methods for wood window restoration. For each phase of repair treatment process, including protection of surrounding materials on the building and Project site during operations. Describe in detail the materials, methods, equipment, and sequence of operations to be used for each phase of repair treatment work.
- C. Shop Drawings:
 - 1. Blade Profiles: Show full-scale profiles for new custom-milled replacement members as required, including frame parts, sash parts, stops, metal weatherstripping, exterior trim parts, and interior trim parts.
 - 2. Replacement Members: Show fabrication and installation of replacement wood window members. Indicate materials and profiles of each replacement member, joinery, finish, and method of splicing or attaching to existing wood window.
 - 3. Replica Windows: For new windows to replace damaged window units, show assembly of window units. Indicate materials, profiles, and joinery, based on other similar windows in the building.
 - 4. Glazing details.
- D. Samples for Verification:
 - 1. For each type of wood window replacement component required, prepared on Samples of size indicated below.
 - a. Custom-Milled Replacement Members: 300 mm (12 inches) long for each replacement member; including frame parts, sash parts, stops, exterior trim parts, and interior trim parts.
 - 1) Original existing elements shall serve as the models for new replacement members. Provide samples of replacement wood window member matching the original member profiles and dimensions.
 - b. Repaired and Refinished Wood Window Member: Prepare samples using existing wood window members removed from site, repaired and refinished as specified.
 - 2. For each type of paint system and each color and gloss of topcoat indicated.
 - a. Submit samples on rigid backing, 200 mm (8 inches) square.
 - b. Step coats on samples to show each coat required for system.
 - c. Label each coat of each sample.
 - 3. Label each sample for location and application area.
 - 4. Metal weatherstripping.
 - 5. Glazing points.

6. All fasteners and intended use.

1.5 QUALITY ASSURANCE

- A. A firm or individual experienced in historic treatment and repair of windows similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance. Contractor must have a minimum of five (5) years experience in construction and supervision of architectural wood repair work. Contractor shall be required to demonstrate this experience with names, dates, and locations of similar projects. All repair and restoration work related to the window repair scope must be performed on the Island of Martha's Vineyard. Manufacturing of any replacement sash or storm windows may be performed off island. The qualifying firm must designate a foreman for the duration of the work with commensurate experience that is approved by Owner.
- B. Master Painters Institute (MPI) Standards:
 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List".
 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- C. Mockups: Prepare existing windows to serve as mockups to demonstrate treatment methods and procedures for aesthetic effects and qualities of materials and execution. Use materials and methods proposed for completed Work and prepare mockups under same weather conditions to be expected during remainder of Work.
 1. Class B Wood Window Repair: Prepare one window unit to serve as a mockup to demonstrate sample repair of wood window members including frame, sash, glazing, hardware, and paint coatings.
 2. Class C Wood Window Repair: Prepare one window unit to serve as a mockup to demonstrate sample repair of wood window members including frame, sash, glazing, hardware, and paint coatings.
 3. Wood Window Fabrication (Class A Repair): If any windows are selected by the Owner for replacement, prepare one entire window unit to serve as a mockup demonstrating the construction and assembly of a new wood window unit replacing a missing original wood window unit in an existing masonry opening. Coordinate schedule for installation of new framing members into masonry substrate to allow for observation by the Owner.
 4. Sample windows to be repaired as mockups will be selected by the Owner and shall include representative existing distress conditions.
 5. Approved mockups shall become part of the completed Work if undisturbed at time of Substantial Completion.
 6. Mock-up testing: Field testing of the new window sash complete with all components and perimeter sealant shall be performed at the mock-up location. The testing is to be performed by a testing laboratory acceptable to the Owner. The cost of the mockups and the testing of the mockups shall be borne by the Contractor. Mockup testing may be witnessed by the Owner or designee and scheduled accordingly.
 - a. Verify water tightness of restored window unit by testing joinery, glazing, and sash and frame perimeters using handheld nozzle in accordance with AAMA 501.2. Adjust installation as needed to prevent water leakage. Pressure shall be modified to be set at 20 psi.

1.6 JOB CONDITIONS

- A. Verify window openings by field measurements before fabrication of replacement windows, if required.
- B. Protection:
 - 1. Work during inclement weather may be performed only if “adequate protection” from the elements is provided such that the building interior and its contents are not exposed to the elements. “Adequate protection” is defined as protection which renders the building and the work watertight and secure against intrusion of the elements.
 - 2. Protect surrounding interior and exterior surfaces and finishes from damage during the execution of window repair.
 - 3. In areas where coating systems are to be applied, protect all building features, sidewalk paving, and landscaping from drippage or other effects of coatings.
 - 4. Protect unfinished work at the end of each day’s work activities.
- C. All work shall be performed in accordance with NFPA 30 Flammable and Combustible Liquids Code and OSHA 39 CFR, Prt 1910. Adhere to the manufacturer’s instructions for safe applications of all cleaning, sealing, resurfacing and stripping materials.
- D. Adequate ventilation must be provided in each area that solvents, cleaners, strippers and varnishes are used, so that accumulations of volatile vapors is below flammable and/or explosive range.
- E. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees Fahrenheit. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees Fahrenheit above the dew point; or to damp or wet surfaces.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the job site in manufacturer’s original and unopened containers and packaging bearing labels as type of material, brand name and manufacturer. Employ specialized storage containers when directed by manufacturer. Delivered materials shall be identical to tested and approved materials.
- B. Unload all materials with care and handled to avoid any damage or contamination of the materials.
- C. Store all materials covered and protected from the weather in strict compliance with the manufacturer's recommendations. The location for storage shall be approved by Owner.
- D. Store materials off the ground in clean, dry and restricted locations; protect from accidental opening and damage. Remove materials which are damaged or otherwise not suitable for use from the job site.
- E. Store coating materials, thinners, solvents, and elements in tightly closed containers in a covered, well ventilated area where they will be protected from exposure to direct sunlight, heat, sparks, flames, weather, or temperatures below 45 degrees F or above 100 degrees F, and in accordance with the manufacturer’s directions and in an area approved by the Owner.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

- F. All coating products stored and used on the site shall be clearly labeled with proper warning to prevent any accidental use of the products by unauthorized persons.
- G. Protect adjacent and underlying surfaces from damage.
- H. Follow manufacturer's label precautions.

PART 2 PRODUCTS

2.1 REPLACEMENT WOOD MATERIALS

- A. Wood: Clear fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of finger joints, blue stain, knots, pitch pockets, and surface checks larger than 0.5 mm (1/32 inch) deep by 50 mm (2 inches) wide.
- B. Selective Replacement of Individual Sash and Frame Components: To match the existing window species and acceptable to the Owner. Currently believed to be Southern yellow pine or mahogany.
- C. Fabrication of New Replica Wood Window Frames and/or Sash to Replace Missing or Heavily Deteriorated Window Units: Honduran mahogany (*Swietenia macrophylla*), certified as sustainably harvested by an organization accredited by the Forest Stewardship Council

2.2 WOOD PATCHING MATERIALS

- A. Wood Consolidant: Ready-to-use product designed for hardening and sealing soft fibers of wood materials that have deteriorated due to weathering and exposure and designed specifically to enhance the bond of wood patching compound to existing wood.
 - 1. Products:
 - a. Abatron, Inc.; Liquidwood.
 - b. Advanced Repair Technology; Primatrate.
 - c. Gougeon Brothers, Inc.; West System.
- B. Wood Epoxy Repair: 2-part epoxy-resin wood compound with a 10- to 15-minute cure at 70 deg F, in knife grade formulation and recommended by manufacturer for type of wood repair indicated. Compound shall be designed for filling damaged wood materials that have deteriorated due to weathering and exposure. Compound shall be capable of filling deep holes and capable of spreading to feather edge.
 - 1. Products:
 - a. Abatron, Inc.; Liquidwood with WoodEpoxy.
 - b. Advanced Repair Technology; Primatrate with Flex-Tec HV.
 - c. Gougeon Brothers, Inc.; West System.

2.3 GLAZING MATERIALS

- A. Glass: Glass for wood windows is specified in Section 08 80 10
- B. Glazing Putty: Oil-based, non-staining and non-bleeding:
 - 1. Wonder Putty, manufactured by Atlas Putty Products Tinley Park, Illinois.
 - 2. DAP 33 Glazing, manufactured by DAP Inc., Baltimore, Maryland.
 - 3. Equal approved by the Owner.

- C. Glazing Points: Type 304 stainless steel. Diamond point, to match existing dimensions.

2.4 WINDOW HARDWARE

- A. Weatherstripping (to replace damaged or missing existing weatherstripping):
1. Meeting rail: Spring brass weather stripping, 28 mm by 0.2 mm (1-1/8 inch by 0.008 inch), with hemmed edges and matching brass nails.
 2. Jamb, sill, and head: Channel groove brass weather stripping, width to match thickness of sash by 0.2 mm (0.008 inch), with hemmed edges and matching brass nails.
 3. Available Manufacturers:
 - a. Dorbin Metal Strip Mfg. Co., Inc.
 - b. Pemko Manufacturing Co., Inc.
 - c. Reese Enterprises, Inc.
 - d. Zero International, Inc.
- B. Repair and Refinish Existing Hardware: Remove window hardware and repair and refinish to match original approved samples.
1. Salvage and reuse existing pulleys, counterweights, and hinges. Provide complete sets of window installation hardware for each window unit.
 2. Salvage and reuse existing sash lifts, locks, latches, and handles.
- C. Replacement Window Hardware: Replace existing damaged or missing window hardware with new hardware to match existing:
1. Material: Match existing.
 2. Design: Provide manufacturer's standard hardware to replicate existing hardware and compatible with existing wood window components.
 3. Weight and Pulley Type: Concealed weight and pulley balance system including rolled steel weights, cast-bronze pulleys, and brass sash chain; provide size and capacity to hold sash stationary at any open position.
 4. Window Hardware Finishes: Match existing.

2.5 SEALANTS

- A. Sealant and bond breaker: Complying with Section 07 92 00.

2.6 COATING FOR WOOD

- A. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Paint Coating: For coating of wood, one of the following systems, or equal approved by Owner.
1. Primer Coat: Alkyd wood primer, 1 coat.
 - a. Sherwin-Williams Exterior Oil Based Wood Primer.
 - b. Benjamin Moore Fresh Start Moorwhite Penetrating Alkyd Primer 100.
 2. Intermediate Coat: Alkyd Fast Dry Primer, 1 coat.
 - a. Sherwin-Williams Preprite Quick Seal (Product # Y24 W980).
 - b. Benjamin Moore Fresh Start Fast Dry (Product 094).

3. Finish Coat: Waterborne acrylic-latex enamel for exterior application, 2 coats.
 - a. Sherwin-Williams SuperPaint Exterior Latex A80/A84/A89.
 - b. Benjamin Moore Aura Waterborne Exterior Paint 629/632/634.
4. Colors:
 - a. Interior surfaces: Match color for existing adjacent wood window trim.
 - b. Exterior surfaces: Match existing.

2.7 PAINT REMOVER

- A. Paint stripper: chemical stripper intended to remove paint, free of methylene chloride.
 1. Peel-Away 7, manufactured by Dumond Chemicals, New York, New York, or equal approved by the Owner.
 2. Heat may not be used to remove paint from wood elements.
- B. Sandpaper of various grades to remove paint remnant following application of chemical stripper. Take appropriate protective measures to mitigate negative impacts of dust.
- C. Plastic scrubber for removing paint and stripper residue from metal items: 3M Scotch-Brite pads or approved equal.
- D. Trisodium Phosphate-type detergent solution.
- E. Carbide Blade Scraper.

2.8 MISCELLANEOUS MATERIALS

- A. Cleaning Materials: Solution prepared by mixing 2 cups of Tetrasodium Polyphosphate (TSP), 1/2 cup of laundry detergent, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for each 5 gallons of solution required.
- B. Fasteners: Provide fasteners compatible with window members, trim, hardware, anchors and other components.
 1. Exposed Fasteners: If exposed fasteners are used, match head style of existing fasteners.
 2. Anchors, Clips, and Accessories: Fabricate anchors, clips, concealed window structural attachments, and all accessories in contact with masonry of Type 304 stainless steel complying with requirements in ASTM B 633 for SC 3 (Severe) service condition.
- C. Fluted Wood Dowels: Hardwood, 3/8 inch diameter.
- D. Adhesive: Polyurethane based wood adhesive with a 15- to 45-minute cure at 70 deg F (21 deg C), in gunnable formulation and recommended by adhesive manufacturer for exterior wood repair.
- E. Storm Windows:
 1. White, double hung, aluminum frame with screen. Blind stop mounting.
 2. Manufacturers:
 - a. Harvey Windows, Danvers, MA, Tru-Channel Storm Windows.
 - b. Larson Manufacturing Co, Brookings, SD, Silver Series Storm Windows.

PART 3 EXECUTION

3.1 GENERAL

- A. Historic windows: Existing materials shall be reused whenever possible in the repair of historic wood windows. This includes all wood elements, hardware and glass that are determined to be of historic significance. Replacement of window elements with new material shall be done only when historic elements are so deteriorated as to prohibit their useful function.
- B. Do not perform any work when the ambient air temperature is less than or is expected to be less than 40 degrees Fahrenheit.
- C. Review and designate a Class A, B, or C repair for each of the twenty-one window locations included in the project.

3.2 CLASS A REPAIR: REPLACE SASH

- A. Remove existing sashes, interior stops, and parting stops from the frames. Salvage counterweights and pulleys where present; discard existing rope cords. Salvage existing latches, lifts, handles, and all other hardware. Existing frame to remain in place at all locations. Care should be exercised not to damage the frame, sash, or adjacent building elements. If required for protection of building interior during the work of other trades, install temporary window enclosures. After removal, sash shall be salvaged and provided to Owner.
- B. Verify window openings by field measurements before fabrication of replacement window components.
- C. Remove and discard all storm windows, security screens, insect screens, etc. Salvage and retain window air conditioners and associated support brackets.
- D. Fabricate new wood window sash matching the dimensions and configuration of original windows and in accordance with approved Shop Drawings. Apply paint coatings and install glazing in new wood window sash.
- E. Rout new wood sash as needed to accommodate new or existing weatherstripping.
- F. Remove and discard existing joint sealants at window perimeters and joinery, including at the joint between wood window framing and adjacent masonry. Existing sealant may contain hazardous components. Perform testing of existing sealant and comply with all requirements relating to containment and proper disposal of hazardous components.
- G. Remove all existing paints and coatings from all existing wood surfaces including frame, sill, and brick mold. Existing coatings may contain lead or other hazardous components. Perform testing of existing coatings and comply with all requirements relating to containment and proper disposal of hazardous components.
- H. Inspect wood surfaces of remaining frame and sill for rot, insect damage, warping, or other deficiencies. Perform epoxy repairs as required. Dismantle frame if required.
- I. Restore existing hardware. Hardware includes but not limited to: pulleys, locks, and handles. Remove existing paints or coatings. Clean corrosion from metal surfaces. Coat brass elements with lacquer. Coat iron or steel elements with paint. Lubricate moving parts.

- J. Apply specified primer to all wood surfaces and allow to cure fully.
- K. Apply specified intermediate paint coating to new window sash and allow to cure fully.
- L. Replace weatherstripping if cracked, split, or missing. Install newly fabricated window sash, using original hardware where available. Hang sash on new brass chain and reusing original counterweights where present. Adjust stops to ensure a tight fit and smooth operation.
- M. With window fully closed, apply specified finish paint coating to all wood surfaces and allow to cure fully.
- N. Reinstall other new or salvaged hardware.
- O. Install new sealant at all exterior joints between wood window framing and adjacent masonry.
- P. Coordinate installation of new exterior storm windows and reinstallation of existing air conditioners.

3.3 CLASS B REPAIR PREPARATION AND SEQUENCE: RESTORE SASH

- A. Prior to proceeding with removal of window sash, develop an identification system to mark each frame, sash, fastener, and hardware for exact location on the building to enable proper reinstallation.
 - 1. Corresponding identification shall be made on building elevation drawing and copies shall be provided to the Owner.
- B. Remove and salvage existing sashes, interior stops, and parting stops from the frames. Salvage counterweights and pulleys where present; discard existing rope cords. Existing frame to remain in place at all locations. Care should be exercised not to damage the frame, sash, or adjacent building elements. Install temporary window enclosures for protection of building interior during the work. After removal, the sash shall be stored in a dry location, above ground and with proper protection for weather and to prevent damage.
- C. Remove and discard all storm windows, security screens, insect screens, etc. Salvage and retain window air conditioners and associated support brackets.
- D. Remove and discard existing joint sealants at window perimeters and joinery, including at the joint between wood window framing and adjacent masonry. Existing sealant may contain hazardous components. Perform testing of existing sealant and comply with all requirements relating to containment and proper disposal of hazardous components.
- E. Remove and discard existing putty, paints, and coatings from all glass and wood surfaces including glazing, sash, stops, frame, sill, brick mold, and interior stool and trim. Existing glazing putty and coatings may contain asbestos, lead or other hazardous components. Perform testing of glazing putty and existing coatings and comply with all requirements relating to containment and proper disposal of hazardous components.
- F. Inspect wood surfaces of sash, frame, and sill for rot, insect damage, warping, or other deficiencies. Perform epoxy repairs as required. Dismantle sash or frame as required.
- G. Restore existing hardware. Hardware includes but not limited to: pulleys, locks, and handles. Remove existing paints or coatings. Clean corrosion from metal surfaces. Coat brass elements with lacquer. Coat iron or steel elements with paint. Lubricate moving parts.

- H. Apply specified primer to all wood surfaces and allow to cure fully.
- I. Re-glaze window sash reusing original glass, or broken glazing with specified glass, glazing points, and putty.
- J. Apply specified intermediate paint coating and allow to cure fully.
- K. Replace weatherstripping if cracked, split, or missing. Reinstall window sash, using original hardware where available. Hang sash on new brass chain and reusing original counterweights where present. Adjust stops to ensure a tight fit and smooth operation.
- L. With window fully closed, apply specified finish paint coating to all wood surfaces and allow to cure fully.
- M. Reinstall other new or salvaged hardware.
- N. Install new sealant at all exterior joints between wood window framing and adjacent masonry.
- O. Coordinate installation of new exterior storm windows and reinstallation of existing air conditioners.

3.4 CLASS C REPAIR PREPARATION AND SEQUENCE: MAINTENANCE REPAIRS

- A. All maintenance repairs will be performed solely on exterior surfaces.
- B. Remove and discard all storm windows, security screens, insect screens, etc. Salvage and retain window air conditioners and associated support brackets.
- C. Remove and discard existing joint sealants at window perimeters and joinery, including at the joint between wood window framing and adjacent masonry. Existing sealant may contain hazardous components. Perform testing of existing sealant and comply with all requirements relating to containment and proper disposal of hazardous components.
- D. Remove all existing paints and coatings from all exterior wood surfaces including sash, stops, frame, sill, and brick mold. Paint stripper should only be used on sill and exterior frame elements. At sash, scrape exposed surfaces to remove loose or poorly bonded existing coatings. Existing coatings may contain lead or other hazardous components. Perform testing of existing coatings and comply with all requirements relating to containment and proper disposal of hazardous components.
- E. Inspect wood surfaces of sash, frame, and sill for rot, insect damage, warping, or other deficiencies. Perform epoxy repairs to sill as needed. If other wood components require repair, notify Owner.
- F. Where one or more sash cords for lower sash are broken, replace both lower sash cords with specified brass chain.
- G. Apply specified primer to all exterior wood surfaces and allow to cure fully.
- H. Where glass is observed to be cracked, re-glaze individual light with specified glass, glazing points, and putty.

- I. With window fully closed, apply specified finish paint coating to all exterior wood surfaces and allow to cure fully.
- J. Install new sealant at all exterior joints between wood window framing and adjacent masonry.
- K. Coordinate installation of new exterior storm windows and reinstallation of existing air conditioners.

3.5 WOOD REPAIRS

- A. Examination and Evaluation
 - 1. Verify actual extent of deteriorated wood at each location. Ensure that all decayed matter and rot-affected wood is removed to a sound wood surface prior to repair.
 - 2. If depth of deterioration is greater than half the thickness of the member than replace the entire member.
 - 3. If deterioration greater than 10 mm (3/8 inch) deep occupies more than 50 percent of the surface area, then replace the entire sash.
 - 4. If deterioration is greater than 2 mm (1/8 inch) deep, and occupies less than 50 percent of the surface, then install an epoxy repair. Notify Owner if there is widespread deterioration greater than 10 mm (3/8 inch) deep that occupies less than 50 percent of the surface.
 - 5. If deterioration is less than 2 mm (1/8 inch) deep, no repair is necessary.
- B. Wood Replacement
 - 1. Carefully remove fasteners at deteriorated member.
 - 2. Remove deteriorated member, taking care not to damage adjacent members.
 - 3. Remove adhesive residue and fasteners from adjacent members.
 - 4. Fabricate new members to match existing size, thickness, shape, and length.
 - 5. Replacement members shall be set square. Profiles and exterior surfaces shall be flush with adjacent surfaces.
- C. Epoxy Repair
 - 1. General: epoxy wood repair materials shall be applied in accordance with manufacturer's written instructions. Health and safety instructions shall be followed in accordance with the manufacturer's instructions. The source or cause of wood decay shall be identified and corrected prior to application of patching materials. Wet wood shall be completely dried to a moisture content of 8 to 12 percent to its full depth before patching. Wood that is to be patched shall be clean of dust, grease, and loose paint. Clean mixing equipment shall be used to avoid contamination. Mix and proportions shall be as directed by the manufacturer. Batches shall be only large enough to complete the specific job intended. Patching materials shall be completely cured before painting or reinstallation of patched pieces.
 - 2. Epoxy liquid consolidant shall be used to penetrate and impregnate deteriorated wood sections to reinforce wood fibers that have become softened or absorbent.
 - 3. Epoxy paste shall be used to fill areas where portions of wood are missing such as holes, cracks, gaps, gouges, and other voids greater than 1/4 inch. Areas to receive epoxy material shall be primed with compatible epoxy liquid wood consolidant or a primer recommended by the manufacturer.

3.6 COATING PREPARATION

- A. Existing paints and clear coatings shall be removed to bare wood. Areas where paint was removed shall be prepared by approved method. All parts shall be cleaned by brush using detergent solution, and let dry.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
- C. Examine substrates and conditions for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- D. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Wood: 15 percent.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- F. Sand surfaces that will be exposed to view, and dust off.
- G. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.7 COATING APPLICATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
- B. Prime edges, ends, faces, undersides, and backsides of wood.
- C. After priming, fill minor holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- D. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- E. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- F. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.8 GLAZING

- A. Bed new or re-used glass lights in glazing putty in restored, primed wood window sash. Glass is specified in Section 08 80 10.

- B. Install new stainless steel glazing points at locations and in sufficient quantity to ensure appropriate support. Care should be taken to ensure that the glass is adequately supported by the glazing points.
- C. Install new glazing putty in profile and depth to match existing. Care should be taken to develop a proper profile (concave) to shed water. Maintain original sightlines of wood sash. Putty installation should create bond between putty and window frame. Allow putty to properly cure prior to coating.

3.9 HARDWARE

- A. Hardware restoration:
 - 1. Remove hardware from wood window elements. Record locations so that each hardware item is returned to its original location.
 - 2. Document individual units where window hardware typical to the building is missing.
 - 3. Soak hardware item in chemical paint stripper to remove existing paint build-up. Do not soak existing brass-finished hardware items that are free of paint.
 - 4. Scrub with plastic pads to remove paint and thoroughly rinse stripper residue.
 - 5. Coat brass or bronze hardware items with lacquer.
 - 6. Spray apply coating to iron or galvanized hardware items. Color: black or other color acceptable to Owner.
 - 7. Reinstall hardware to original window. Use solid brass screws to install brass or bronze hardware items. Use stainless steel screws with coated heads to install iron or galvanized hardware items.

3.10 INSTALLATION

- A. Install restored window sash level, plumb, square, true to line, without distortion or impending thermal movement, and securely in place with stops. Provide new parting stops as required, finished to match adjacent original wood surfaces and milled to fit securely in existing frame rabbet.
- B. Provide salvaged or new hardware for all windows. Hardware includes but not limited to: pulleys, counterweights, locks and latches, handles, and lifts. Provide new brass chain for all counterweighted window sash.
- C. Coordinate with installation of new storm windows.

3.11 SEALANT

- A. Install new bond breaker/backer rod and sealant at perimeter of wood frame and sill at joint with masonry substrate.

3.12 STORM WINDOWS

- A. Remove all storm windows and frames.
- B. Replace with new storm windows, including screen, using current blind stop mounting location.

3.13 ADJUSTMENT, CLEANING AND PROTECTION

- A. Clean glass promptly after installation, exercising care to avoid damage to finish of new and existing surfaces. Wash and polish glass on both faces not more than four (4) days prior to date scheduled for final inspection. Comply with glass manufacturer's recommendations for final cleaning and maintenance.
- B. Remove and replace glass which has been broken, chipped, cracked, abraded or otherwise damaged during construction period, including that damaged by natural causes, accidents and vandalism.
- C. Touch-up any painted areas of the Work that may have been affected during the Work.
- D. Remove all protective materials and clean up construction debris.

3.14 FIELD QUALITY CONTROL

- A. Permit the Owner to make random inspections of Work in process on and off site and completed repairs.

3.15 CLEAN-UP

- A. Remove waste materials, debris and rubbish from site at the end of each working day.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect/Engineer, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.
- E. Upon completion of work, remove all debris and construction material from site. Leave site in clean condition.

END OF SECTION