

GREENING MEASURES FOR HAWAII'S HERITAGE HOMES

CLASS 4: WINDOWS

MASON ARCHITECTS
ALAN SHINTANI, INC.



HISTORIC HAWAI'I FOUNDATION

A membership-based, statewide non-profit organization, Historic Hawai'i Foundation encourages the preservation of historic buildings, sites and communities relating to the history of Hawai'i.

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OUTLINE OF TODAY'S CLASS

- ❑ Welcome and Overview (5 min.)
- ❑ Window Types and Terminology (5 min.)
- ❑ Keep your Historic Windows (10 min.)
- ❑ Restoration & Repair (10 min.)
- ❑ Energy Efficiency (10 min.)
- ❑ Replacement? (5 min.)
- ❑ Resources & Advocates (5 min.)
- ❑ Anatomy of a Window (20 min.)
- ❑ Discussion (20 min.)



PRESENTERS

Barbara Shideler, AIA, Mason Architects

President, Association for Preservation Technology – Hawaii-Pacific Chapter

Barbara joined the firm's predecessor, Spencer Mason Architects, in 1989, transitioned to Mason Architects Inc. as the firm launched in 1998, and became a partner in 2009. She has a B.Arch. and a Graduate Certificate in Historic Preservation from the University of Hawai'i.

Barbara has designed the restoration and renovation of significant historic buildings and residences in Hawai'i, including award winning projects at Kaumakapili Church and the Historic Kaua'i County Building. She has prepared design guidelines and preservation plans for historically significant projects as diverse as Kōke'e and Waimea Canyon State Parks, Punahou Campus, and the Hāna Highway Historic Bridge District.

PRESENTERS

Alan Shintani, Alan Shintani, Inc.

Alan is the president of Alan Shintani, Inc., founded in 1984. He has been a general contractor for 37 years. Shintani began as a small residential contractor in 1981 with the business originating with a commitment to Hawaii residents & local businesses.

Some of his achievements include the historical renovation of the Royal Mausoleum Chapel, Mauna Ala in 1984; 8(a) Contractor 1996; awarded Special Congressional Recognition by the City and County of Honolulu and the US Small Business Administration for Small Business Person of the Year 2002, to name a few.

Alan is very active in the community as a contributor to Moanalua Lion's Club and Knights of the Orthodox Order of St. John.

GOALS OF THE SERIES

- ❑ To share measures homeowners can implement to save energy, conserve resources and integrate respectfully with local culture and natural geography in a way that is harmonious and compatible with a property's historic character and features.
- ❑ To help historic homeowners reduce their homes' carbon footprint while retaining the properties' historic integrity.
- ❑ To provide information and knowledge to help owners preserve the historic property; save energy, money and resources; and contribute to the natural health and vibrancy of their neighborhoods
- ❑ To encourage historic homeowners to approach maintenance of their properties through the lens of sustainability in order to provide affordable and accessible sustainability tools and techniques to incorporate into their preservation maintenance plans.

MAINTENANCE PLANS

Handout for developing a maintenance plan:

- ☐ Green tips
- ☐ Inspection Checklist
- ☐ Template for creating lists of:
 - Character-defining features
 - Key actions
 - Timing
- ☐ References/Additional Resources



Historic Windows Overview



Today's session will cover the

- ☐ Maintenance
- ☐ Repair &
- ☐ Upgrade

of **wood sash** windows, as these types account for the majority of historic residential windows in Hawai'i.

Historic Windows

Fenestration: design and arrangement of windows



Four basic window functions:

- admitting **light** to the interior spaces,
- providing **fresh air** and ventilation to the interior,
- providing a **visual link** to the outside world, and
- enhancing the **appearance** of a building.

Historic Windows

Window Types

Types & Styles



Double (or Single) Hung

Whether your style is classic or contemporary, double or single hung windows are a beautiful choice for any home. Plus, their top & bottom (double) or bottom (single) sliding sashes provide very efficient ventilation.



Casement Windows

They feature one hinged sash that glides out, welcoming the breeze in. Most common in newer homes, casement windows are coveted for their clean, uncluttered views and effortless operation.



Awning

As practical as they are beautiful, these windows are hinged at the top and open out like an awning. Both traditional and contemporary designs, they're often placed above other windows & doors.



Bay and Bow

These windows reach out into the world allows you to have more windows to capture the view and enjoy the scenery. Bay windows are typically made up of three windows.

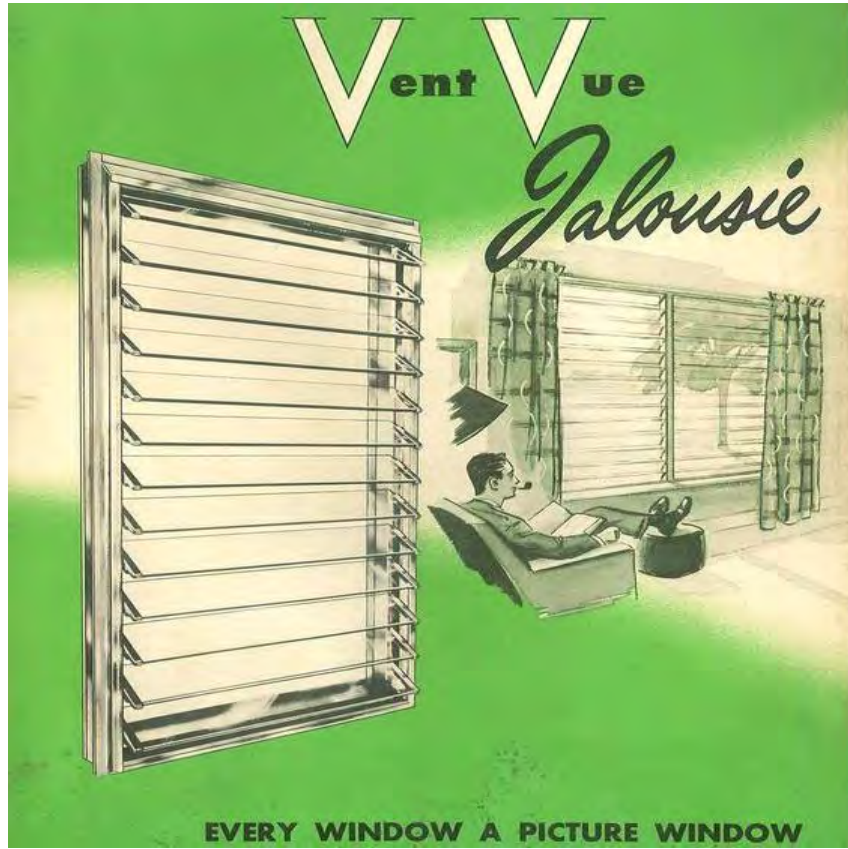


Sliding

One sliding sash glides open horizontally, allowing for easy operation — an ideal choice for difficult-to-reach places.

Historic Windows

Jalousie or Louver Window



Jalousie — a window consisting of a series of overlapping horizontal frameless louvers which pivot simultaneously in a common frame and are actuated by one or more operating devices so that the bottom edge of each louver swings outward and the top edge swings inward during operation.

Historic Windows

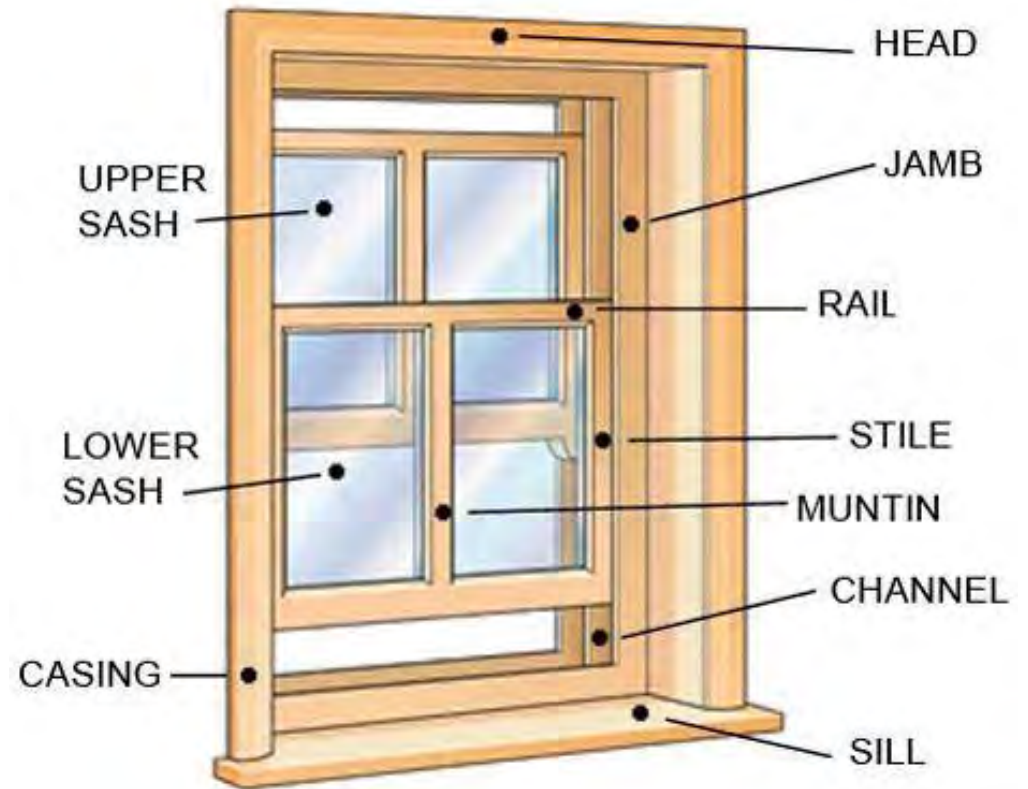
Anatomy of a Window

Frame — the surrounding structure of a window that fits into the wall and receives a sash.

Jamb / Head — vertical and horizontal members forming the side and top of the frame.

Sill — horizontal member forming the bottom of the frame.

Casing — applied trim at the interior or exterior of a window frame.



Historic Windows

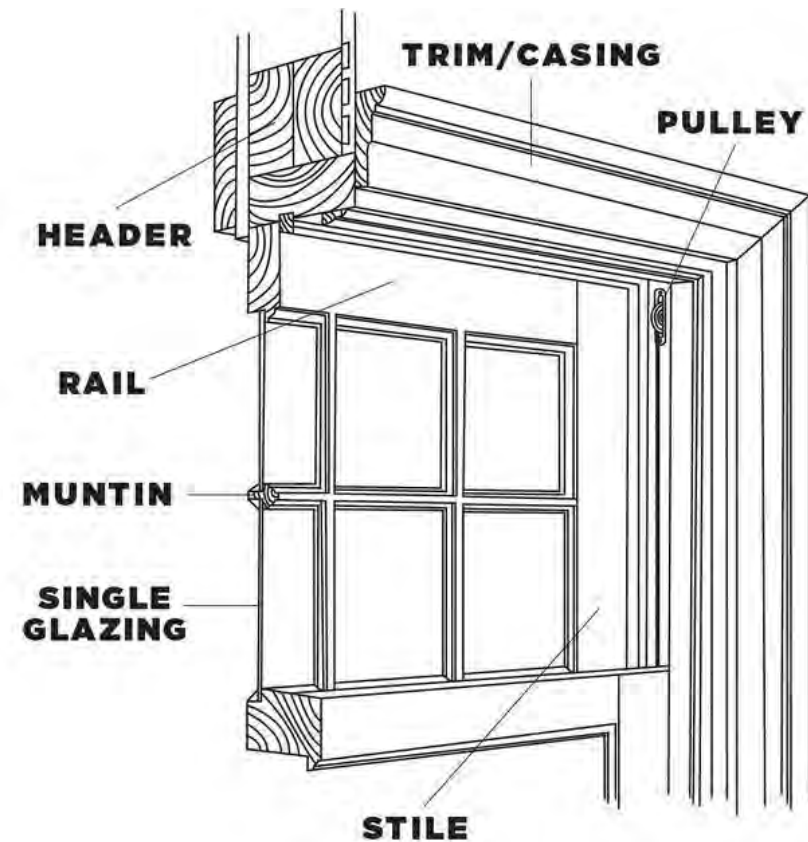
Anatomy of a Window

Sash — the operable part of a window that fits within a frame and is designed to accommodate the glazing.

Stile /Rail — a vertical and horizontal members of a sash, leaf, or panel.

Lite (light) — a pane of glass used in a window, door. Frequently spelled "lite" in industry literature to avoid confusion with visible light.

True divided lite (TDL) — a lite in which dividers (muntins) separate the glazing into individual smaller glazing lites.



Historic Windows

8 Reasons to Keep Your Old Windows



1. Authenticity

A large part of a historic home's character is held in its windows.

Original historic windows were custom built to fit their frames and complement the design of the house in a way that no replacement can.

Historic Windows

8 Reasons to Keep Your Old Windows



2. Quality

Materials: Old-growth lumber is denser, more dimensionally stable, and more rot and insect resistant than today's options.

Workmanship: Historic windows traditionally have pegged mortise and tenon joints that are the strongest and most stable joints made by Master Carpenters.

Historic Windows

8 Reasons to Keep Your Old Windows



3. Repairable

Wood windows are readily repairable.

Their parts (hardware, sash, and glass lites) are designed to be repaired or replaced when they reach the end of their useable life.

Historic Windows

8 Reasons to Keep Your Old Windows



4. Resale

Buyers of historic properties will pay a premium for homes with their original features still intact.

The most important features looked for by buyers are original floors and windows.

Historic Windows

8 Reasons to Keep Your Old Windows



5. Efficiency

Windows account for only 10-20% of energy loss in a typical home (much less than roofs and doors).

When kept in repair historic windows can be efficient windows. And, with simple retrofits, a single-paned window can match a replacement window's efficiency.

Historic Windows

8 Reasons to Keep Your Old Windows



6. Operability

The pulley and weight counter balance system used in double-hung windows has not been improved upon. It provides the greatest ease of use through decades with minimal maintenance.

And wood windows are designed to operate smoothly with greater tolerances to building movement and other issues that inevitably arise in older buildings.

Historic Windows

8 Reasons to Keep Your Old Windows



7. Lead Safety

By restoring your windows, you can assuage your lead paint concerns.

Once they have been stripped and fully restored the fears of lead paint are no longer an issue for your historic windows.

Historic Windows

8 Reasons to Keep Your Old Windows



8. Sustainability

The **greenest** window is the one that is already installed.

Most replacement windows have a lifespan of 20-25 years when a historic window can last several lifetimes.

By retaining your original windows you keep materials out of the landfill!

Historic Windows Restoration

Old windows need **restoration** when they are:

- Inoperable
- Damaged
- Leaky and energy-inefficient
- Lead paint containing

With a few simple steps, your historic windows can be as **efficient** as a new window, but much longer lasting!



Historic Windows Restoration

We feel a responsibility to save items of worth, to acknowledge their story, and to share it with future generations.

Before you replace your windows, call a skilled carpenter to restore them.

It is cost effective and **sustainable!**



Historic Windows

3 Essential Repairs

Old windows need a few things to perform as good or *better* than new windows:

- ❑ Make them **weathertight**.
- ❑ **Maintain** them to prevent rot or other deterioration.
- ❑ Improve **energy efficiency** with easy retrofits.

With three simple steps, your windows will last a lifetime, retain your home's value, and meet today's energy-efficiency standards.



Historic Windows

Weathertightness

Repair or renew:

- Caulking / sealants
- Weatherstripping
- Glazing putty

In our tropical climate, we seal windows to keep the rain out and cool air inside.



Historic Windows

Maintenance

Cleaning – Keep windows and glazing clean. This will prevent the glass from etching.

Inspection – Inspect for rot, termites or other deterioration. Address defects before they affect the function of the window.

Operability – Operate your windows, lubricate hinges or stays, tighten screws. Replace missing or damaged hardware.



Historic Windows Repair

Dutchman - Wood patch that replaces a damaged or missing area. The procedure involves removing a symmetrical, squared area around the defect and replacing it with new wood of the same species, grain pattern and color as the original.

Epoxy Repair – Wood epoxy is formulated for repair of wood windows, matching the tensile strength and other characteristics of the original. Consists of a consolidant and an epoxy paste for minor repairs of rot to complete reconstruction of profiles.



Historic Windows Painting

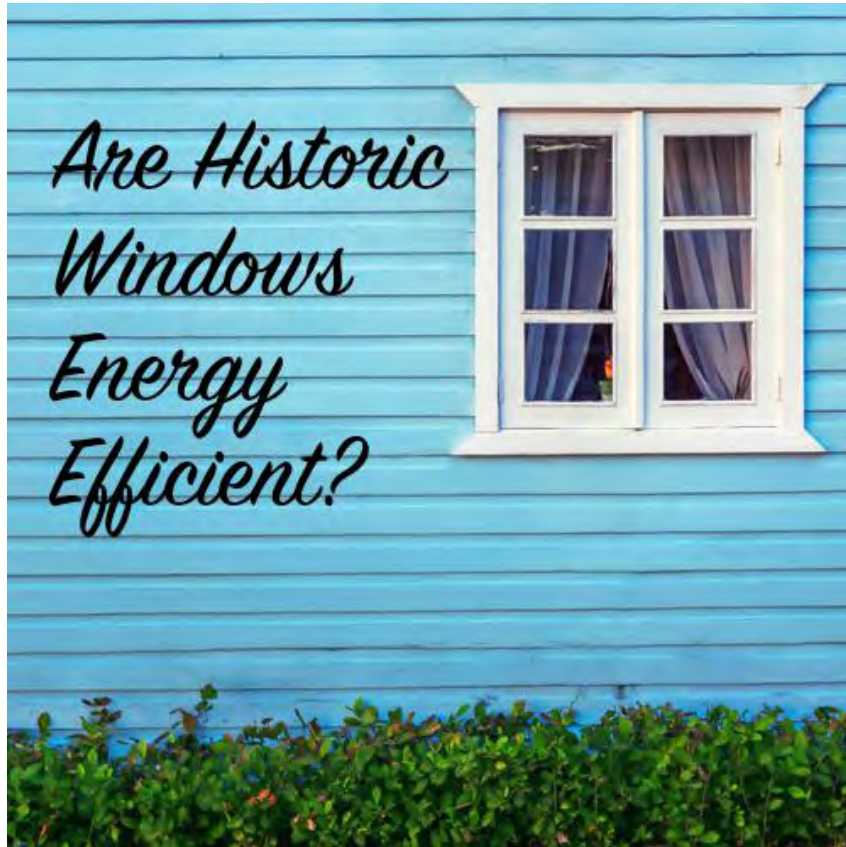
PRO TIPS:

- Be AWARE of lead paint safety requirements!
- Use oil-based primer and 2 quality topcoats (latex or alkyd)
- Paint the glazing putty after it cures
- Don't paint the friction edges or parting bead; this causes the windows to stick.



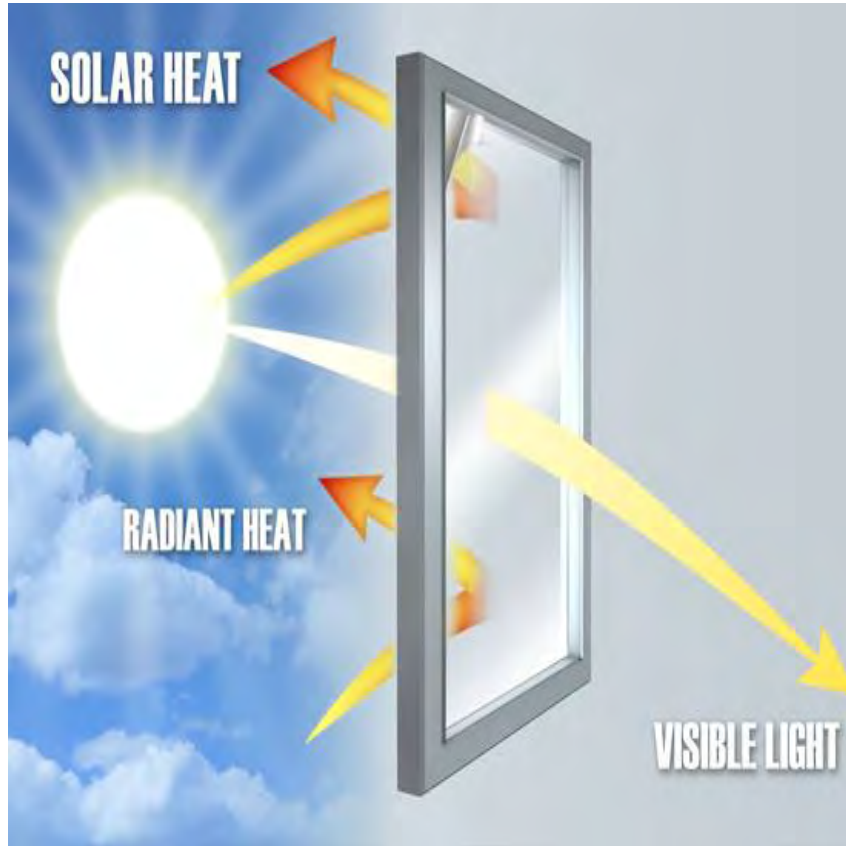
Historic Windows

Energy Efficiency



“Every historic window can be repaired and made to be as or more energy efficient than a replacement window.”

Historic Windows: Improving Efficiency



In cooling climates, like Hawai'i, we are primarily concerned with keeping sunlight out and cool air inside.

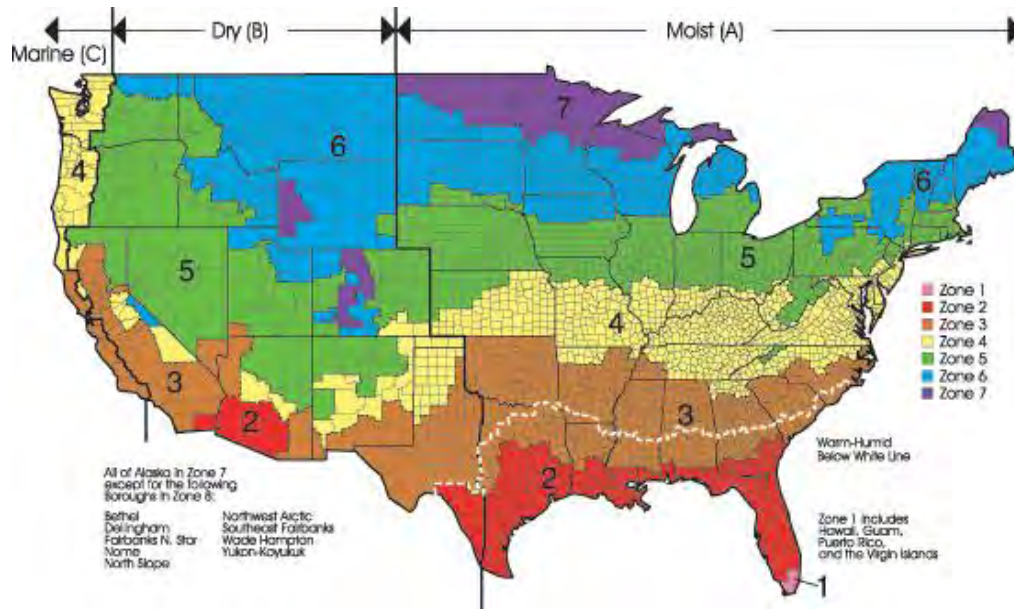
The measure of a window's ability to perform in this manner is called:

Solar Heat Gain Coefficient (SHGC)
(aka "shading coefficient").

Note: Existing and historic residences are exempt from code-mandated SHGC values.

Historic Windows

Performance Standards



Building Energy Codes for Windows

The International Energy Conservation Code (IECC) applies to **new construction**. Each model energy code establishes specific U-factor maximums for fenestration (with separate requirements for skylights) and SHGC maximums for all glazed fenestration.

Residential Prescriptive Window Requirements in the 2018 IECC

Climate Zone	Window U-factor	Window SHGC	Skylight U-factor	Skylight SHGC*
1	No Requirement	≤ 0.25	≤ 0.75	≤ 0.25

Historic Windows

Window Film

Retrofitting with Window Film:

- Energy Saving and Climate Control
- UV-blocking for fade Protection
- Glare reduction
- Safety and Security

Generally, in historic buildings, we install **neutral gray films**, without obvious color or highly-mirrored surfaces.



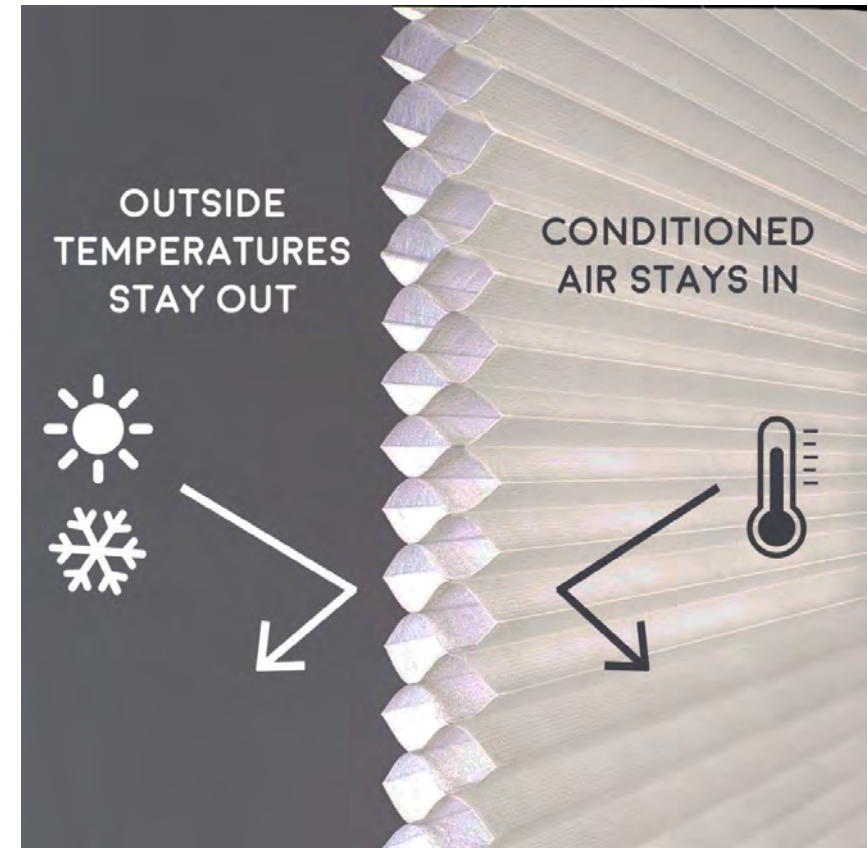
Historic Windows

Window Shades

Insulating Cellular Shades:

Cellular or honeycomb shades have horizontal columns of air trapped between two or more connected layers of blind

- Increases R-value (measure of insulation). Single honeycomb shades have an insulation value around R-2, while double-layer honeycomb shades can reach R-5.
- Readily available at local home improvement stores
- Inexpensive



Historic Windows

Window Awnings

Exterior awnings:

- Along with drapes, curtains, shutters, and blinds they provided natural climate control in an age before air conditioning and tinted glass.
- Easily installed and reversible.
- Relatively inexpensive

National Park Service, Preservation Brief 44:
*The Use of Awnings on Historic Buildings,
Repair, Replacement and New Design.*



Historic Windows

Landscape

U.S. Department of Energy's
Landscaping for Energy Efficient Homes

Hot-Humid Region:

- Maximize summer **shade** with trees that still allow penetration of low-angle winter sun.
- Channel summer **breezes** toward the home.

Landscaping for Shade

Shading is the most cost-effective way to reduce solar heat gain in your home and **cut air conditioning costs**.

To effectively shade your home, you need to know the size, shape and location of the shadow that your shading device casts.



FACT: In tree-shaded neighborhoods, the summer daytime air temperature can be up to **6 degrees cooler** than in treeless areas.

Historic Windows

Replacement Windows

What to do if your windows are missing or must be replaced?



Historic Windows

Replacement Windows

Alternative Materials:

Vinyl –

- PVC (poly vinyl chloride) is bad for the environment
- Thicker frames provide less opening.

Aluminum

- Pits and corrodes in salt air.
- Difficult to repair.

Window manufacturers boast that their windows are **Maintenance Free**. That may be true, because maintenance free means **Cannot Be Maintained**.



VINYL



ALUMINUM

Historic Windows

Replacement Windows

Wood - a wood window is like a finely crafted piece of furniture made by a skilled carpenter to last generations.



WOOD

Historic Windows

Replica Windows

A custom millwork shop or specialty carpenter can match your wood window's original:

- Design
- Size
- Muntin configuration
- Trim and casings
- Finish
- Hardware

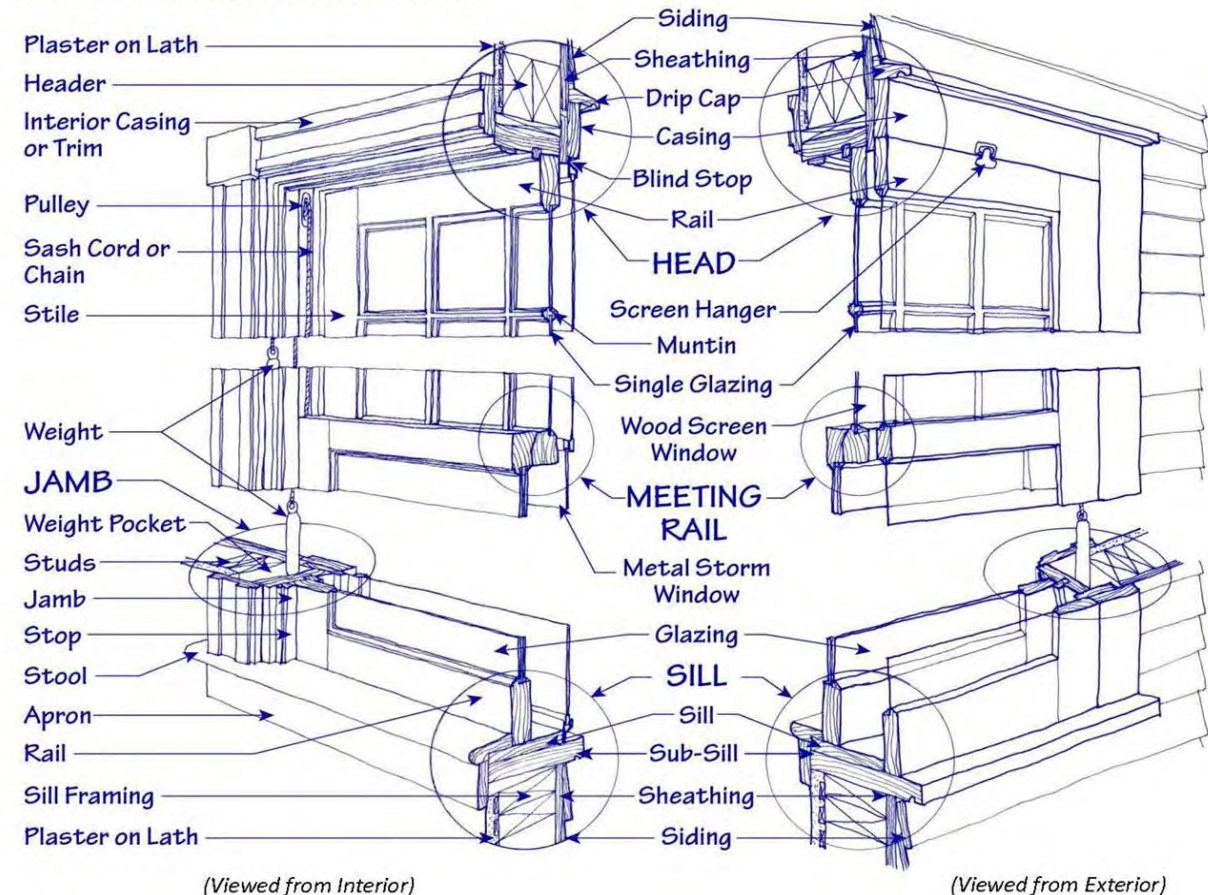


Historic Windows

Anatomy of a Window

Introducing Alan Shintani...

DOUBLE-HUNG WINDOW COMPONENTS



Historic Windows Resources



Historic Windows

Glazing and Repair Materials

The Craftsman Store

<https://thecraftsmanblog.com/store/>

Abatron

<https://www.abatron.com/>

(ph. 800-445-1754)

Kilian Hardware

<http://kilianhardware.com/>

(ph. 215-247-0945)



Historic Windows

Historic Glass

AGW Old Style Glass

<https://www.agwglass.com/> (ph. 410-366-0300)

Hollander's Restoration Glass

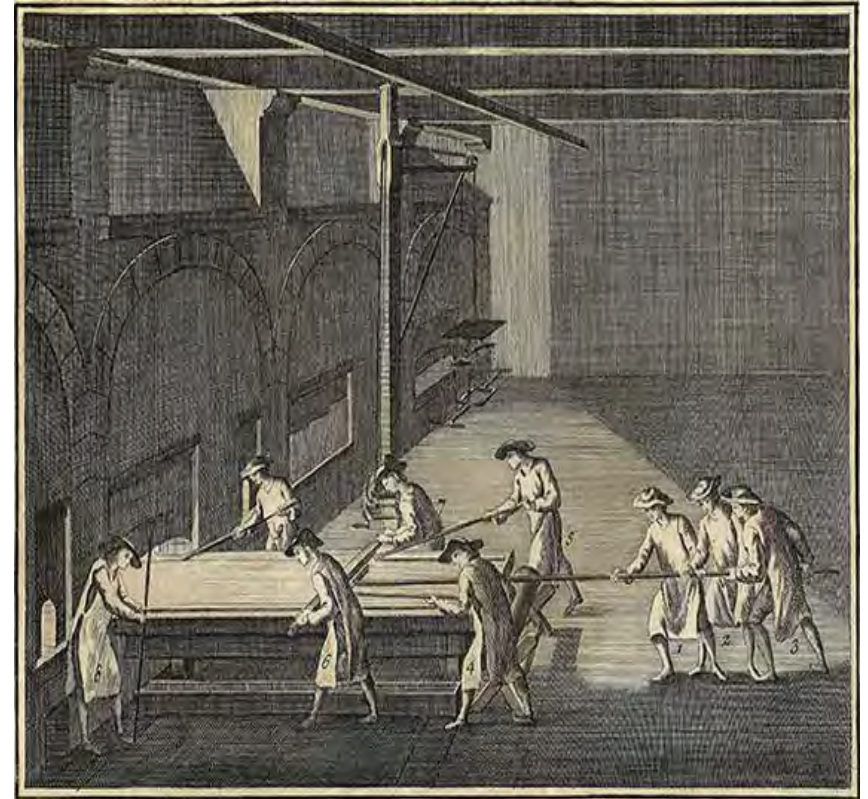
<http://www.restorationwindowglass.com/>
(ph. 800-421-0449)

Bendheim Restoration Glass

<http://www.restorationglass.com/>
(ph. 800-221-7379)

Pioneer Glass

<https://www.pioneer.glass/> (ph. 508-234-7063)



Historic Windows Hardware

SRS Hardware

<https://www.srshardware.com/>

(ph. 401-954-9431)

Phelps Company

<http://www.phelpscompany.com/>

(ph 603-336-6213)

American Historic Hardware

<https://ahhardware.com/> (ph 607-547-1900)

House of Antique Hardware

<https://www.houseofantiquehardware.com/>

(ph 888-223-2545)



Historic Windows Advocates



Historic Windows Advocates

Window Preservation Alliance

<https://www.windowpreservationalliance.org/>

The WPA's goal is to help preservationists find the tools they need to educate building owners, architects, and other decision makers about the value of original windows.



Don't Replace...Repair

Historic Windows Advocates

Window Preservation Standards Collaborative

<http://windowstandards.org/>

Window Preservation Standards were developed to save older and historic windows through ordinary maintenance, repairs, and energy saving upgrades.

The Window Preservation Standards Collaborative (WPSC) was founded in 2010 and now includes over one hundred and fifty other window specialists from across the country and in Canada.



Historic Windows Advocates

**National Center for Preservation Technology
and Training (NCPTT)**

<https://www.ncptt.nps.gov/>

NCPTT is a technical branch of the National Park Service with headquarters in Louisiana and serves as a “Federal Center for Preservation Technology” within the Department of the Interior.

They funds research projects and training events, including “hands-on” Window Preservation workshops.



Historic Windows Advocates

National Trust for Historic Preservation's GREEN LAB

<https://savingplaces.org/preservation-green-lab>

This report, “Saving Windows, Saving Money: Evaluating the Energy Performance of Window Retrofit and Replacement”, provides cost guidance for homeowners weighing the financial and energy tradeoffs between replacing or repairing older, less efficient windows.

This report builds on previous research by examining multiple window improvement options, comparing them to replacement windows across multiple climate regions.



Saving Windows, Saving Money: Evaluating the Energy Performance of Window Retrofit and Replacement

A REPORT BY:



FUNDED BY:



IN PARTNERSHIP WITH:



Historic Windows Advocates

Historic Hawaii Foundation

<https://historichawaii.org/>

Hawaii's statewide advocacy organization for historic preservation, Historic Hawai'i Foundation often receives requests for referrals for a variety of professional preservation services.

To respond to this need, we have compiled a directory of preservation professionals who work in Hawai'i through our Preservation Resource Center. The Hawai'i Preservation Professionals Directory is organized by categories and is available to the public via HHF's website.

HISTORIC
HAWAII
FOUNDATION

PRESERVATION PROFESSIONALS DIRECTORY



Update: December 2014

DISCUSSION

GREENING MEASURES FOR HERITAGE HOME SERIES 2018

- ❑ April 9: SIGNIFICANCE & SUSTAINABILITY: What makes your historic home unique & sustainable measures to green it
- ❑ April 23: WATER: Water conservation, storm-water management and on-site water reuse
- ❑ May 7: ENERGY: Renewable energy & conservation: solar, wind, lighting, appliances, energy incentives
- ❑ MAY 21: WINDOWS: Sustainability measures to maintain/restore your historic windows
- ❑ JUNE 4: LANDSCAPE: Creating a sustainable & culturally-sensitive landscape