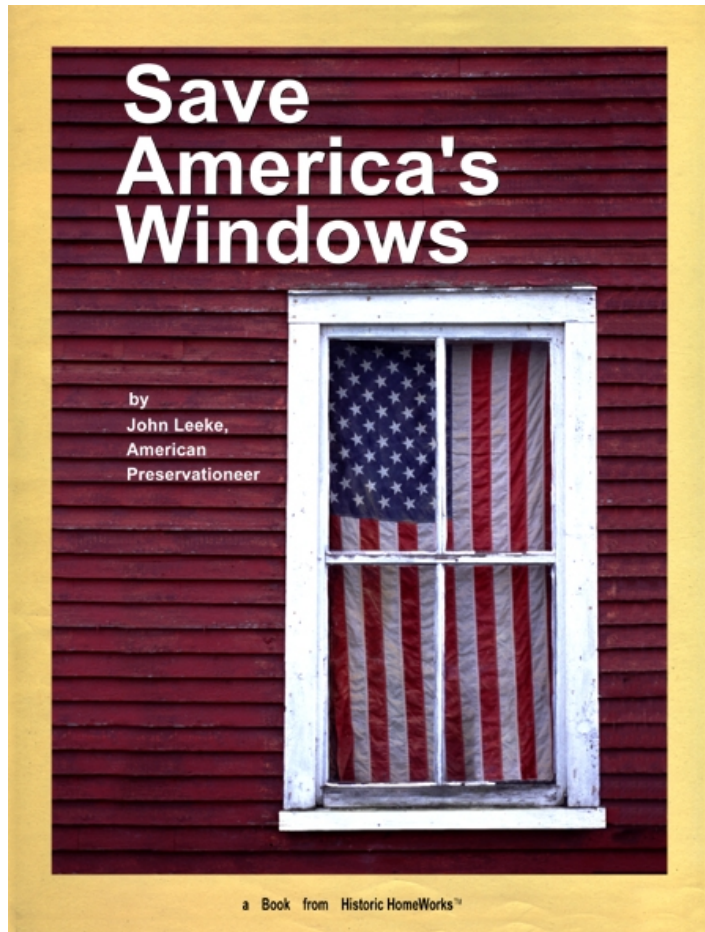


# Save America's Windows

By JOHN LEEKE, American Preservationeer

## Table of Contents

The Remodeling Industry.....	2
Historic Preservation.....	2
Compromise .....	3
New Hope for Endangered Windows.....	4
Window Project Profiles .....	6
Homeowner Saves a Houseful .....	6
American Precision Museum .....	8
Project Planning.....	12
Conditions & Priorities.....	12
Costing .....	13
Goals and Objectives .....	15
Window Basics.....	16
Safety .....	18
Treatment Basics .....	18
Repair and Maintenance Strategies.....	18
Wood-Epoxy Repairs .....	18
Sill Repairs.....	20
Sill Basics.....	20
Conditions and Causes.....	21
Weather Check Filling.....	24
Treating Deep Decay .....	28
Sill Replacement.....	29
Paint and Maintenance .....	31
Sash Repairs.....	32
Sash Basics.....	32
Sash Joint Conditions & Causes.....	33
Failing Joint Stabilization.....	34
Minor Joint Decay at Surface.....	37
Sash Removal .....	39
Shop Set Up, Lead-Safe Operations .....	46
Shaping Stock.....	48
Muntin Rib Repair.....	52
Muntin Replacement.....	54
Minor Decay Within Joint .....	55
Bowed Meeting Rail .....	56
Meeting Rail Replacement.....	58
Lower Rail Replacement with Stub Stiles.....	62
Glazing & Painting Sash .....	63
Work Area Setup .....	63
Types of Glass .....	63
Cleaning Glass .....	64
Glazing Basics.....	67
Painting Basics.....	70
Safety .....	73
Best Advice from the Pros: .....	73
Sash Glazing & Painting .....	74
Nineteenth Century Sash Making .....	83
Resources .....	86
Suppliers .....	86
Window Repair Specialists .....	91
Publications .....	111
Credits.....	111



Thousands of wood windows are ripped out of this country's older and historic buildings each year and hauled to the dump. This astonishing loss is due in large part to the fact that few people know how to care for existing wood windows. This book provides an economical and practical alternative to trashing your fine old windows and buying replacements made of plastic. You will learn the most practical and economic methods of window maintenance and repair.

- Specific step-by-step treatments to repair weathered sills and deteriorating sash, since these are the two most common excuses for trashing original windows
- How windows are constructed, why some last for centuries and others rot and fall apart after just a few years
- Traditional methods and the latest in contemporary high-tech materials and techniques
- How to avoid falling under the spell of the window replacement salesman

These are sample pages from the Save America's Windows book. Get your copy of the full book over at the website:

<http://saveamericaswindows.com/get-the-book/>

## Window Basics

Wood windows must perform complex and often contradictory functions:

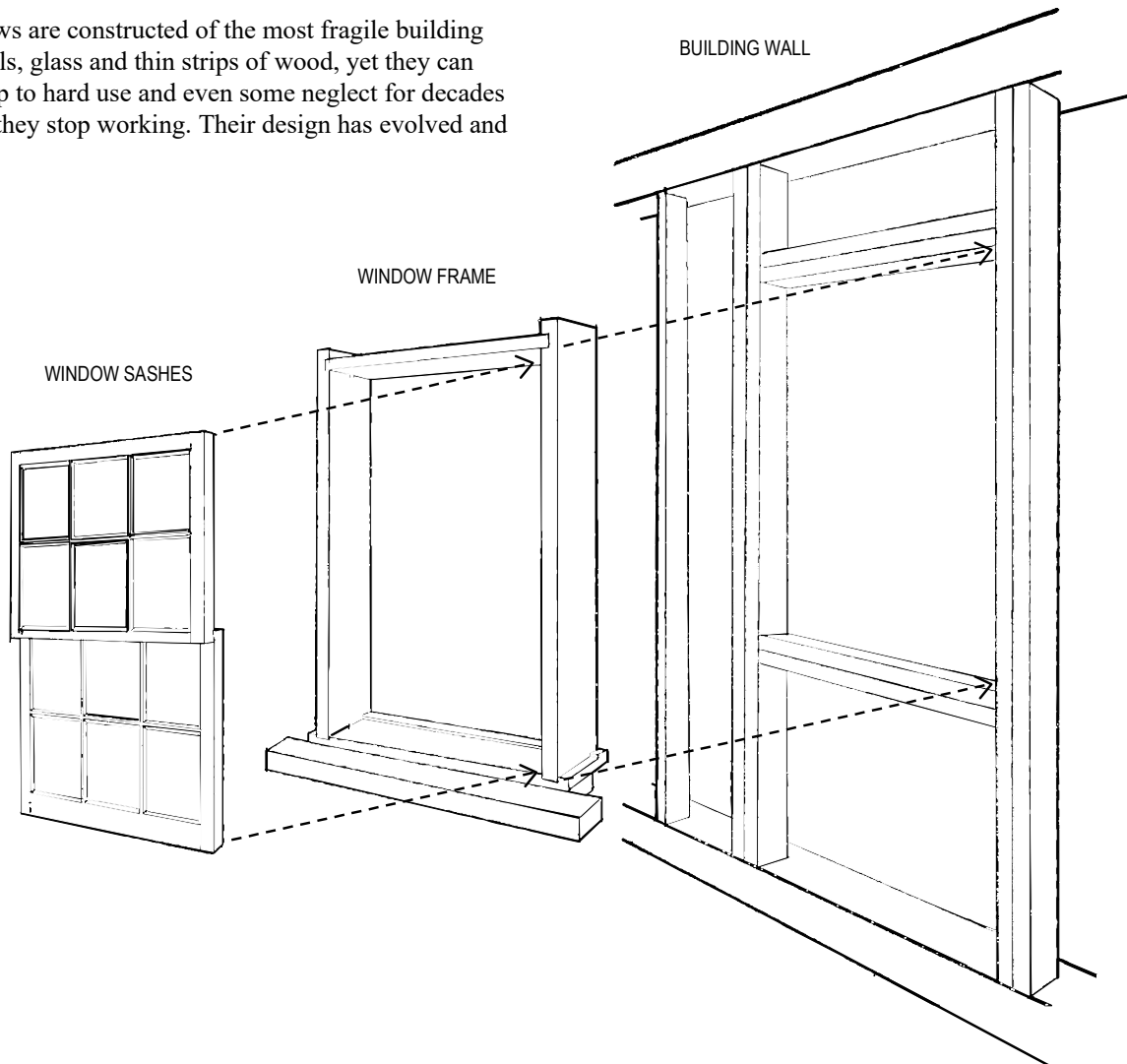
- Keep weather outdoors when it is wet and cold, yet let weather indoors when it is hot and you need a cooling breeze.
- Let the daylight into the building, yet keep light out when you have to get some “shut-eye.”
- Help you escape quickly in case of fire, yet defend against entry of burglars.
- Give you a view of the world outdoors and the moon beyond, yet keep the neighbors from peering into your private space.

Keep all these basic functions in mind as you repair and maintain your windows. Throughout this report, the functions of the various window parts and systems will be described.

Windows are constructed of the most fragile building materials, glass and thin strips of wood, yet they can stand up to hard use and even some neglect for decades before they stop working. Their design has evolved and

been refined over centuries. There is little extra material in a wood window so it is important to keep it all in good condition.

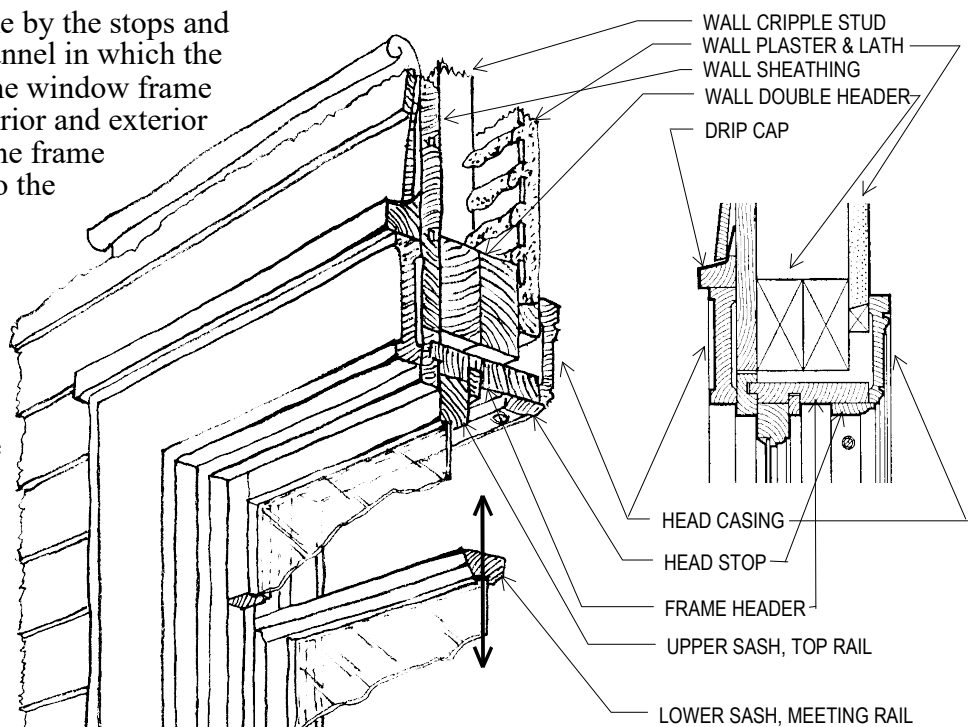
People commonly think of windows as the part they handle and open, the sash. More strictly speaking, the whole window includes the sash, the frame and the casings and other small parts that hold the window into the rough opening in the building wall.



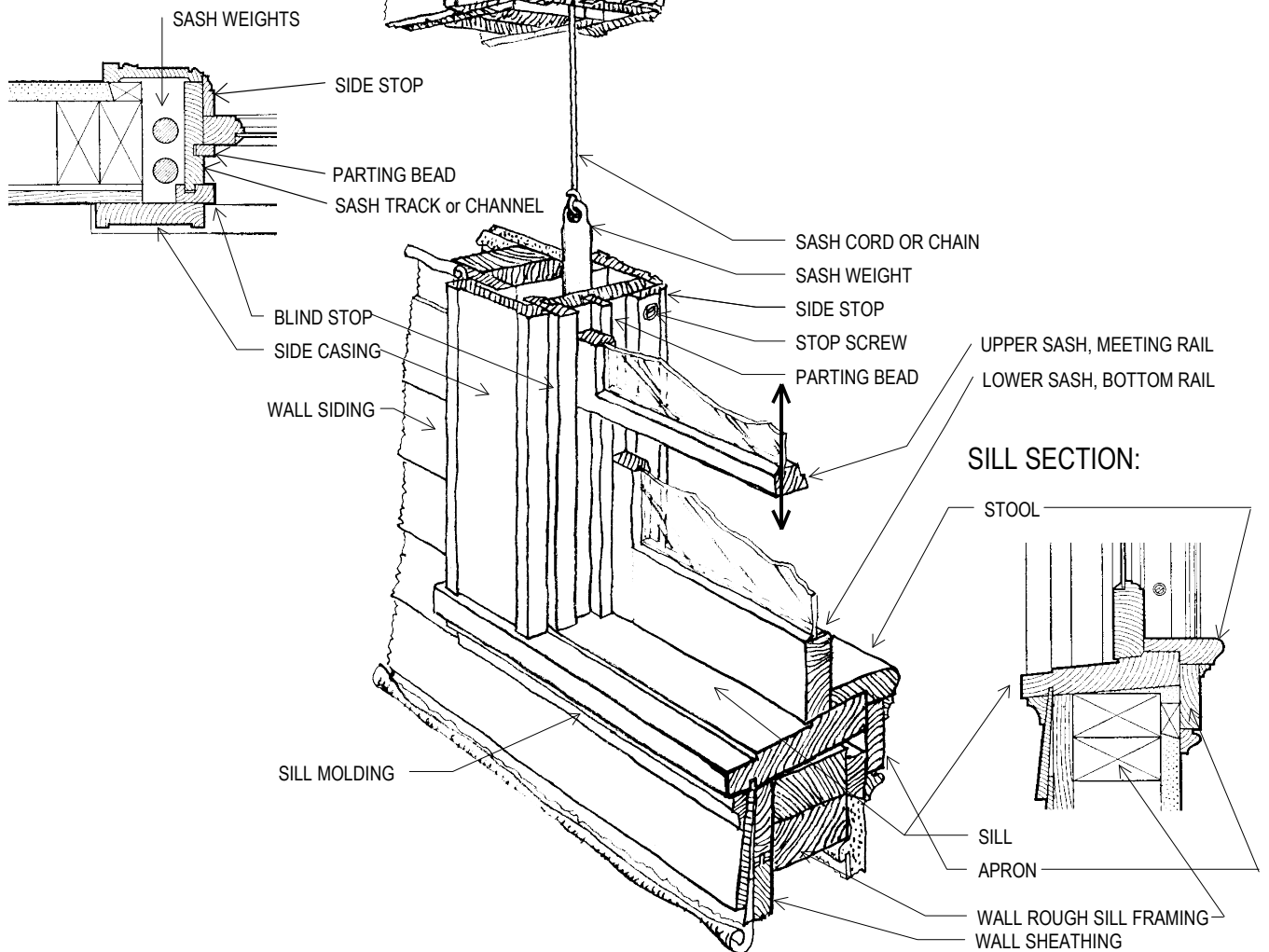
The sash are held in the frame by the stops and parting beads that form a channel in which the sashes slide up and down. The window frame is held in the wall by the interior and exterior casings which are nailed to the frame along their inner edges and to the wall along their outer edges.

As I survey and assess the conditions of windows I sketch sections of the jamb, header and sill with measurements and notes on materials. These sketches are important planning tools -- as important as the pry bars and scrapers used later on. They help me understand how the window is constructed and how it should operate.

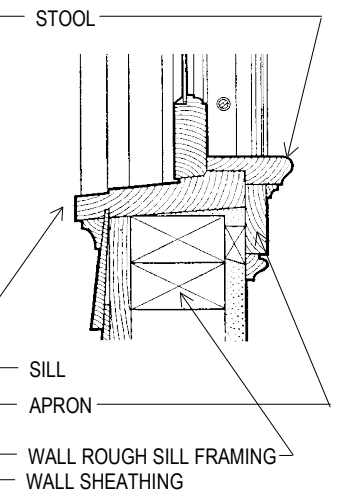
### HEADER SECTION:



### JAMB SECTION:



### SILL SECTION:



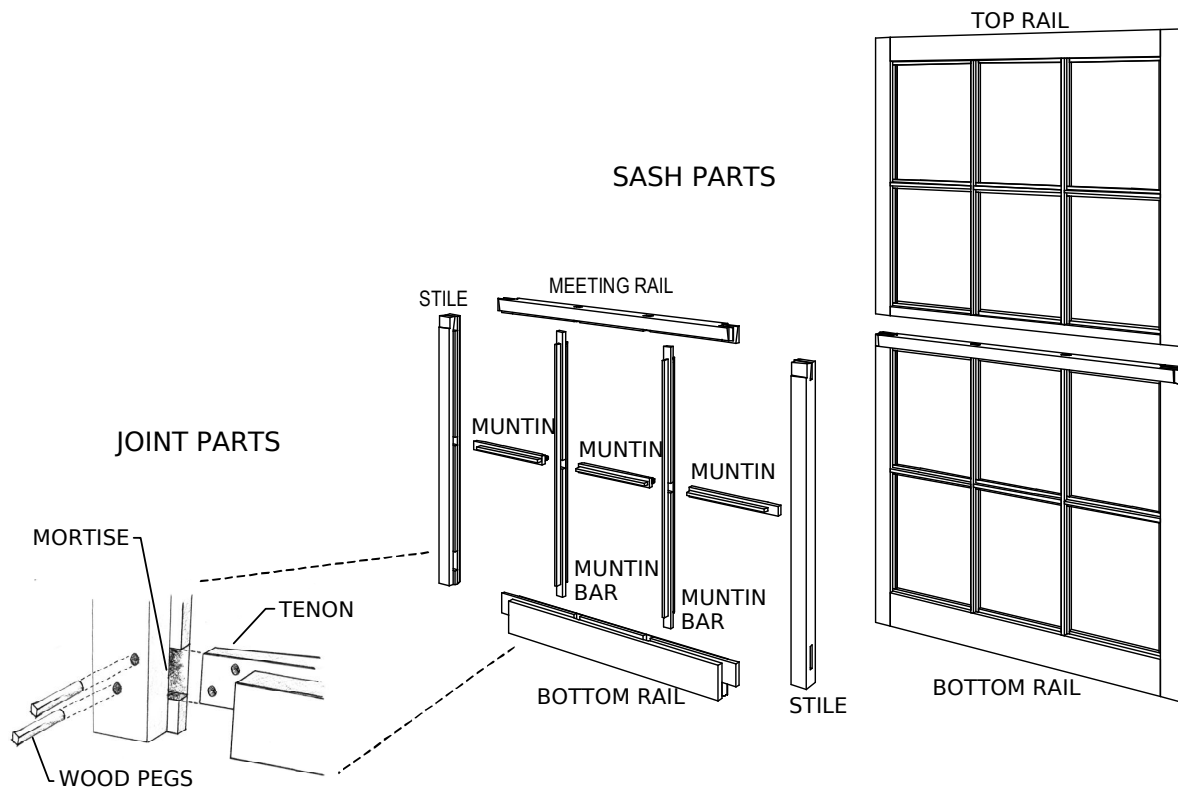
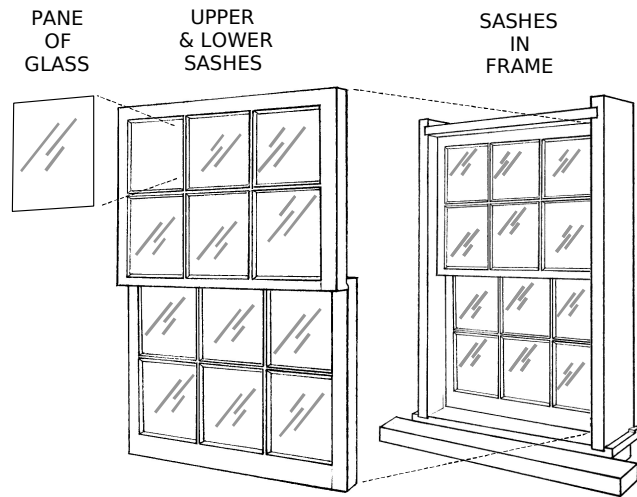
# Sash Repairs

## Sash Basics

Sashes are wooden frames that hold the glass panes. In a double-hung window, there are two sashes that slide up and down in the frame. If only the lower sash moves it is called single-hung.

The sashes slide up and down in the sash channel, which is part of the frame. They must be loose enough to slide freely, but not so loose that the wind and rain blows in around the edges. The channels and edges of the sash are designed and carefully fit to make this possible.

Sashes can deteriorate progressively as paint fails, the outer glazing falls out and wood decays, or they may be damaged in a single episode when they are broken by accident or by vandals.



The sash is made of an outer frame formed by vertical stiles and horizontal rails which are joined at the corners with mortise and tenon joints. The sash may be divided into smaller lights by wooden muntins. Muntins are thin strips of wood that are, like the sash frame, molded on inner edges and rabbeted on outer edges to hold the panes of glass.

Tight-fitting joints fastened by wood pegs or steel pins and their interlocking design hold all of these parts together. Traditionally no glue is used, which allows the stiles and rails to naturally expand and shrink without loosening the joint. Another advantage of this type of free joint construction is that the sash can be taken apart and the individual parts repaired or replaced as needed. Some of the repair methods shown in this book preserve the free joint construction so the sash can be taken apart and repaired in the future. Other repair methods shown result in a locked joint which cannot be taken apart. Generally, free joint repairs are preferred, but they may take longer to do. You must decide if this added cost is worth preserving the intent of the original free joint construction.

## Failing Joint Stabilization

When a sash joint is seriously weakened and letting go it can be stabilized to await a more permanent treatment in the future. An old-time repair method is to screw on a flat corner iron or brace.

Some people regard this quick fix as a slipshod shortcut. I have repaired many sashes that had corner irons slapped on years and even decades before. Without the angle irons those sashes would have fallen apart and been tossed out as trash long before I came along to save them with more effective repairs. I now consider corner irons a reasonable low-cost short-term repair that saves sashes. Even if everyone forgets what "short-term" means, the corner irons can do their job of holding sashes together for decades. I add preservative and sealant treatments that make this simple repair a more effective stabilization.  
-- JL

The photo shows a meeting rail joint that has failed because its pinhole and pin have decayed. The meeting rail has dropped an inch, leaving a gap between the edge of the glass pane and the putty, which is still attached to the rail. Sometimes the pane drops too, leaving a gap between the top rail and the top edge of the pane.

Failing joints at the top rail of the upper sash and bottom rail of the lower sash can also be stabilized with this same treatment.

Time and costs:

This is a quick low-cost treatment that can take 15 minutes to gear up and 15 minutes to stabilize two joints at one window. Material and supply costs are about \$3 per joint.

Tools:

- Leather work gloves
- Goggles, to protect eyes
- Putty knife
- Small steel brush
- Screwdriver
- Electric drill & 3/16" twist bit
- Caulking gun
- Pliers

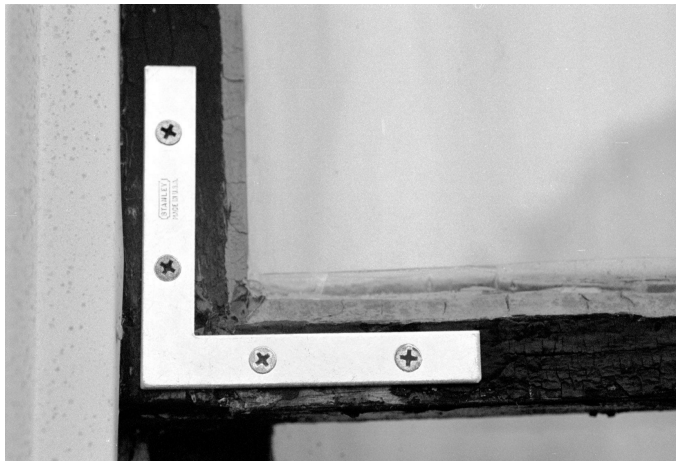
Supplies & Materials:

- Tape, for the glass panes
- Wooden stick & shingle, to brace the rail
- Nitrile rubber gloves, to protect hands from preservative
- Borate wood preservative (such as, Jecta brand, or BoraCare), to prevent decay
- Paper towels or rags, for clean up
- Flat corner irons (such as, Stanley, 4"/101mm, zinc plated steel, 30-6580, DP999; or, Brainerd® Flat Corner Braces, 32405, B56040G-ZP-U)
- Removable sealant (such as, Red-Devil® Zip-A-Way™ Clear), to seal the joint

Before Treatment:



After Treatment:



### Step 1. Tape and brace

Tape the glass panes above if you plan to leave it in place during this treatment and especially if they are broken or unstable. The tape will help control flying shards of sharp glass if a pane breaks during the treatment.

If the joint has decayed enough to let go, the meeting rail may have dropped down a little. The meeting rail needs to be braced up in case the joint lets go all together. Brace it temporarily with a wood stick. Cut a stick of wood about 1" longer than the distance from the sill up to the bottom surface of the meeting rail. Lay a wood shingle on the sill to protect it from marring. Wedge the stick lengthways between the shingle and the meeting rail, right near the loose joint (photo, right). Don't force it in too tightly, wedge it just enough to hold the stick and the meeting rail in place.



### Step 2. Clean and position

Clean loose debris out of the stile joints, any muntin joints and glazing dados with a putty knife so the meeting rail can be lifted back up into its original position next to the glass pane, without stressing the glass. The pane may have shifted downward, so pay attention to the top edge of the pane where some cleaning may also be needed. Slide the lower end of the bracing stick toward the window frame to provide a slight and controlled pressure to lift the rail up into position. If the pane needs to shift upward, but it is not moving easily, it may have to be removed or you may accept its current position and the fact that the meeting rail cannot be lifted all the way into its original position.

Clean loose paint and debris off the surrounding wood and glass surfaces with a wire brush for good adhesion of the sealant to come.



### Step 3. Inject preservative

Prevent or limit decay by injecting borate preservative directly into the joint if moisture problems around the window cannot be resolved right away. Inject the preservative right into the open joint while it is still open a little if decay is minor. Or, drill an injection hole so it does not weaken the joint by cutting the tenon. In cases of major decay inject right at the interface between decayed and sound wood. The wood need not be dry for this treatment; in fact, borate preservatives migrate into wet wood faster than dry wood. Borate preservatives are usually compatible with effective future treatments such as wood-epoxy repairs and wood Dutchmen. Keep the borate preservative well within the joint or holes so it does not prevent adhesion of the sealant to come. Do not use penetrating water-repellent preservatives because they can prevent future treatments from penetrating and may cause adhesion problems for paints and sealants.





#### Step 4. Seal gaps and joints

Seal any gaps in the joint and between the glass and glazing compound or glazing rabbet with removable sealant. This type of sealant can be easily removed in the future without significant contamination of the surfaces. The surfaces must be dry for good adhesion. Fan wet surfaces or warm gently with a hair drier or hot-air gun for several minutes to promote drying. Apply the sealant with a caulking gun and tool away excess sealant flush with the face of the sash right away. Then let the sealant cure for several minutes until it is no longer tacky, so the corner iron to come will not be unintentionally glued to the sash.



#### Step 5. Screw on the angle iron

Pre-drill pilot holes and screw on the corner iron. Use utility screws (similar to wallboard screws) made of hot-dipped galvanized or stainless steel. Ordinary wallboard screws could be used, but they may rust out in a few years making later removal difficult and may not withstand the shear-loads encountered on larger sash.

Remove the temporary wood stick.

The stabilization is complete. List the sash in a future project for a more permanent repair, or add it to the maintenance schedule to monitor its condition at least once every three years.



## Save America's Windows

### Safety, Accuracy, Non-warranty

While safety topics may be mentioned in these sample pages of the book do not consider this to be complete coverage of safety issues. Always keep safety foremost in your mind throughout your project, especially when working with or near chemicals, electricity or when working in high places (if your feet are off the ground you are in a high place). Building construction and renovation is one of the most hazardous industries.

Every effort is expended to make this book as accurate as possible. If you find inaccuracies, please write to me. This book is subject to change without notice. This book is presented for its informational value only, It is up to you, your architect, contractor, tradespeople or building owner to determine if the methods, materials and ideas presented here should be used on your project. John Leeke assumes no responsibility or liability for how you use the information. When specific technical advice or other expert assistance is required bring in a qualified and competent professional or specialist for onsite advice.

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