

Save America's Windows



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 report provides an economical and practical alternative to trashing your fine old windows and buying replacements made of plastic.

These pages are provide only as samples of the book. Successful and safe use of the methods shown here may depend on information in the rest of the report. Contents of the report may vary from what you see here since they are updated frequently. Feel free to copy and pass this sample file along to others. Obtain the complete report at:

<http://www.historichomeworks.com/hhw/reports/reports.htm>

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Window Project Profiles

Homeowner Does Well

Dana, a do-it-yourselfer in Worcester, Massachusetts, had all vinyl replacement windows in his fine old four-square home. When a “sister house,” one just like his, in his neighborhood faced the same misfortune, he noticed all the old sashes stacked up out by the curb waiting for the garbage truck. He knocked on the door and ended up hauling all the old sash and window parts over to his place.



Dana repairs a sash in his basement workshop. His wife brings down coffee and rolls to keep him at it.

Dana worked on his window restoration project on weekends over the course of two or three years. He completely refurbished each sash, stripping off all the paint and putty, removing the glass, painting and glazing. Then he gleefully ripped out the vinyl windows.



Dana counts up his stockpile of fine old sashes and window weights—better than money in the bank.



Dana tosses the ugly vinyl window out on the trash heap! No, wait, Dana's no fool. Actually he carefully removes and sells them on the second hand market to finance his window restoration project.

The restored sash fit right into his window frames. Dana installs them with new sash cords.

Dana reports, "I just wanted to let you know that I've finally finished restoring all the windows at our house in Worcester. I even learned how to build a frame for one of the windows, with weight pockets, pulleys, and parting beads. A previous owner had put in a door where a window originally was, so my wife and I are especially thrilled to have it back the way it was when the house was first built. It's been a great learning experience for us, and makes us appreciate our old home even more now. Now it's on to freeing the house from it's vinyl siding straight jacket. Yahoo !!!!!"

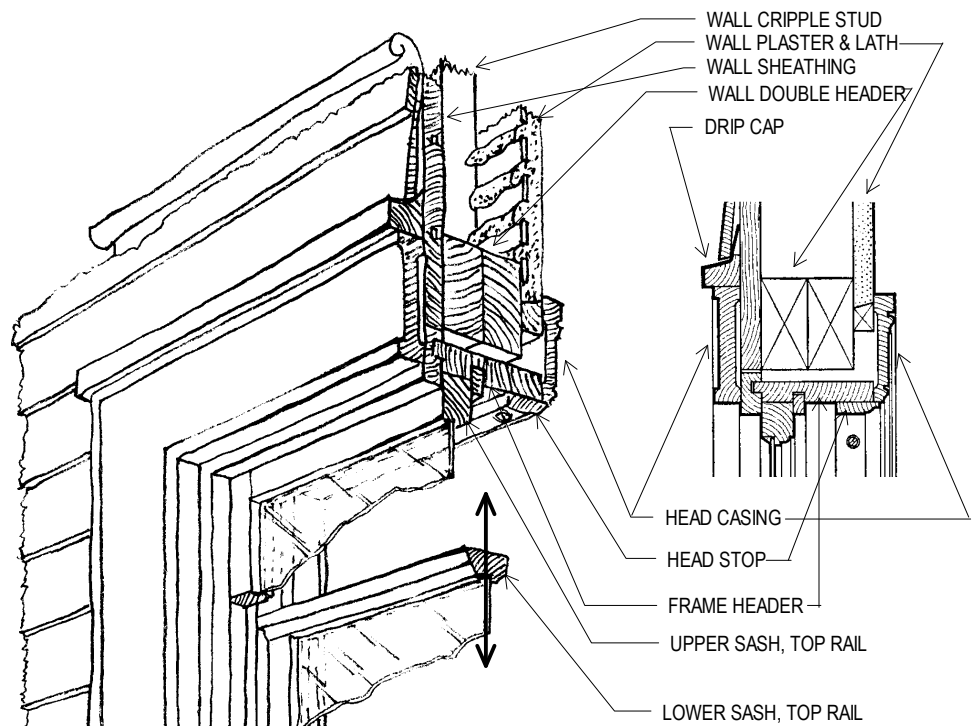


Dana carefully fits his restored sash into the window frame. His wife just loves to look out through that nice old wavy glass. Nice windows and a happy wife. What joy!

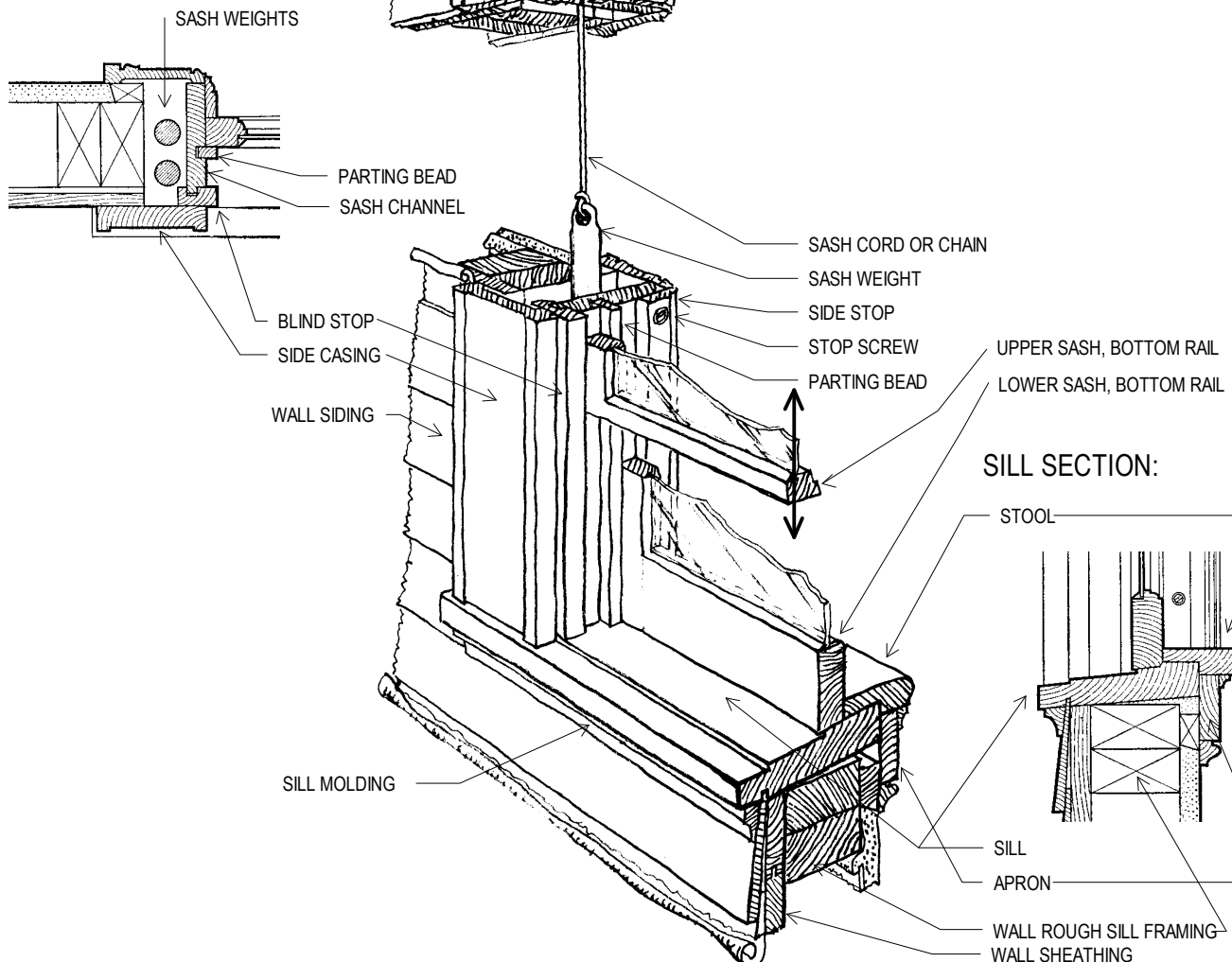
The sash are held in the frame by the stops and parting beads which form a channel in which the sash slide up and down. The window frame is held in the wall by the interior and exterior casings which are nailed to the frame along their inner edges and to the wall along their outer edges.

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:



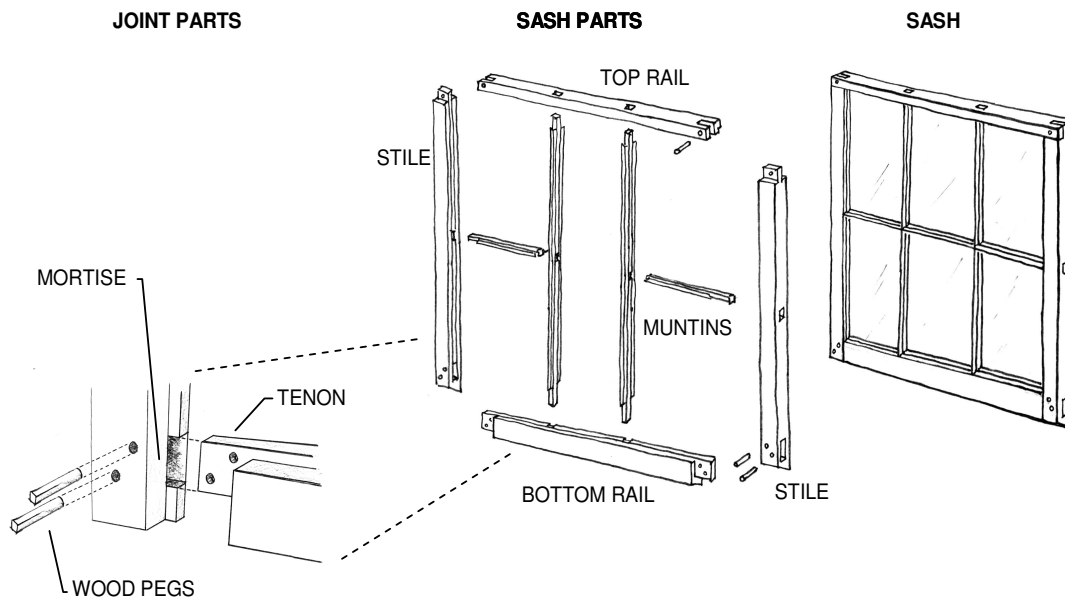
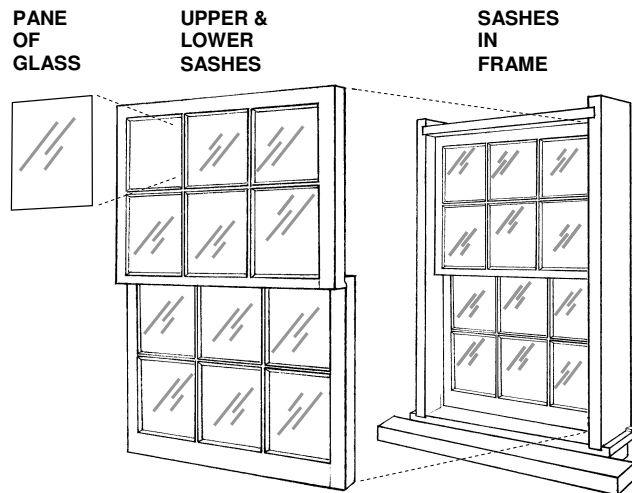
Sash Repairs

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. One of the advantages 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 report 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 take longer to do and 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 pin hole 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.

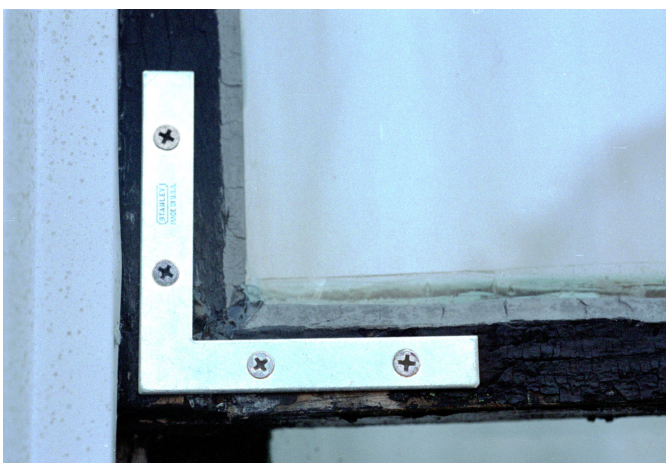
Time and costs:

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.

Before Treatment:



After Treatment:



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



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. 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.

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.



Shop Set Up

Set up a sash repair workstation in a work-space and isolate it from occupied spaces to safely control the health hazard of lead containing dust that is generated during sash work. A flat, steady work table is needed and a carpenter's workbench with vises is handy for holding sash and parts while you work on them. Arrange enough room nearby to stack sash and stockpile materials such as wood, glass, glazing compound and paint.

Lead-Safe Operations Highlights

- **Protect People and the Environment:** Prevent the spread of lead to the rest of the building and the environment.

Generate the least amount of dust,

In the smallest space,

For the shortest time,

Exposing the fewest people.

Use a Floor Containment system that catches lead-containing debris and dust. Notice this floor containment serves both the sash easel and the end of the workbench. It is made of 6-mil poly with wood 1"x2" furring strips rolled into the edges of the poly and fastened at the corners with two sheetrock screws. Size the floor containment system to be 5 feet in each direction from the location where debris is generated. The floor containment can be made with a gap in the furring strips of the long-side so it folds up like a clam shell. This allows the containment to be moved from one area to another while keeping all the dust in the containment.

Wear Tyvek slippers within the floor containment and removed them when ever you step out of the containment.

Damp-wipe sash and tools before removal from the containment.

Change work clothes for street clothes as you leave the work-space at the end of each work session. Launder work clothes separately from family clothes and then double rinse the washing machine before family laundry is done.

- **Protect Occupants:** Keep them and their pets out of the work-space.
- **Protect Workers:** Minimize exposure to keep lead out of their bodies.

Wear hat to keep lead dust out of hair.

Wear goggles to protect eyes from flying debris.

Wear respirator fit tightly to face around the mouth and nose that filters the air through replaceable cartridges.

Do not eat or drink during work periods to prevent ingestion of lead. This means workers must be well hydrated by drinking lots of water during breaks and off hours.

Do not smoke during work periods. Lead containing dust is easily transferred from fingers to the cigarette and is then vaporized and inhaled.

Wash hands and face when leaving work-space and before eating, drinking or smoking.

- **Establish a Comprehensive Lead-Safe Program:** These highlights do not make up a complete lead-safe program.

Study and use the Lead Paint and Historic Buildings Training Manual. (See Appendix.)

Hold a daily safety meeting.

Test workers for blood-lead levels.

Test work-spaces for lead before and after operations.



CARPENTRY AND JOINERY.

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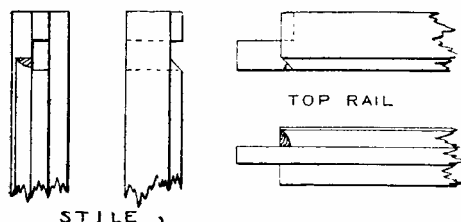


Fig. 882.—Joint of Top Rail and Stile.

cased frame and double-hung sash, together with splayed jamb linings with moulded panels. Fig. 878 shows a horizontal section through one

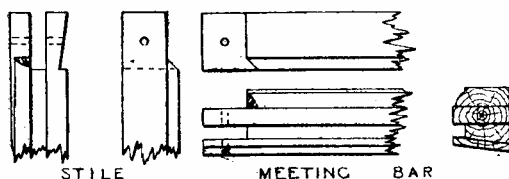


Fig. 883.—Joint of Meeting Bar and Stile.

side of a French casement 4-ft. window opening, in a wall built of coursed rubble with ashlar dressings. The frame is solid, and the hanging

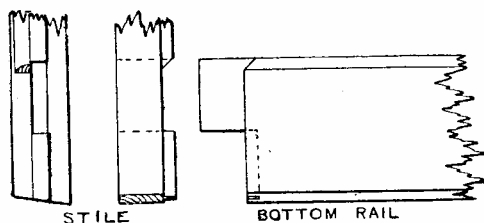


Fig. 884.—Joint of Bottom Rail and Stile.

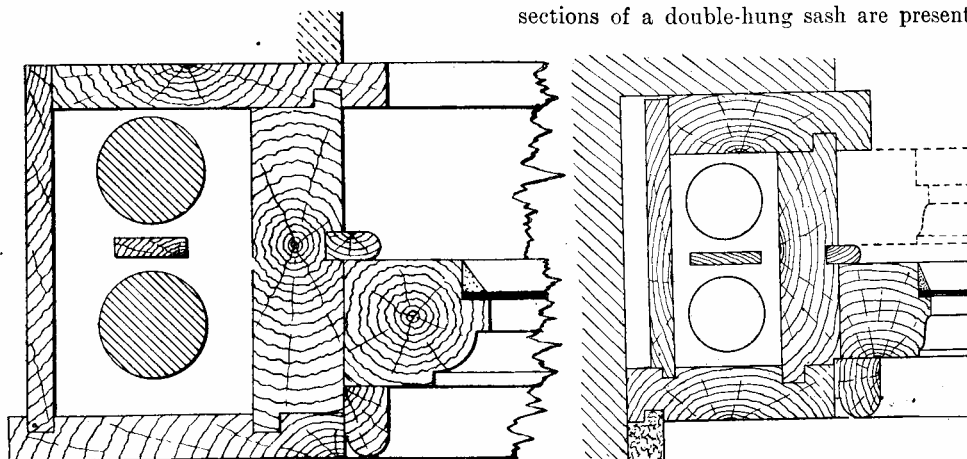
stile of the sash opens inwards; the jamb lining has moulded panels and double-face architraves. Lath and plaster on batten plugged to the wall is also shown.



Fig. 885.—Enlarged Section through Window Sash.

Window Sashes.

An elevation and vertical and horizontal sections of a double-hung sash are present



Figs. 886 and 887.—Horizontal Sections through Cased Frames, Pulley Stiles, etc.

How to Use this Report

Architects:

Refer to Practical Restoration Reports in your specifications then just include an issue of the report. Provides a hands-on approach contractors appreciate.

Contractors:

Bring your crews up to speed quickly on new preservation techniques with Practical Restoration Reports. Move into productive work with less time and hassle.

Homeowners:

Practical Restoration Reports give you the information you need to talk with tradespeople and contractors confidently. Use them as do-it-yourself guides.

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"Your Practical Restoration Report is really superb. It is the best thing I've seen on the subject. It's clearly written, not overly technical and easy to understand."—Roger Reed, Maine Historic Preservation Commission

"I landed the contract because your Reports gave me the insight and confidence needed to explain the project to the clients. They said I was the only contractor to give them any hope that the job could be done." "Your reports are most informative and concise. I'm very impressed!", James A. McGrath, Contractor, Eggleston, VA

"Practical Restoration Reports are short, non-technical, and well illustrated...For the building owner, contractor, or architect with a need of solid working information about both what to do and how to do it, they are economical and useful."—Allen Charles Hill, AIA, Winchester, MA

Safety, Accuracy, Non-warranty

While safety topics may be mentioned in this report 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 report as accurate as possible. If you find inaccuracies, please write. This report is subject to change without notice. This report 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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If you have any questions on this report, or would like to see a report on a particular topic please write or send email.

Have a better idea? If I have learned one thing working on old buildings it is that there is always more than one way to do any job. Let me know if you have found a better way. I will reward you with free reports for any ideas I use. – John Leeke

Problems with your old building? I work with you and your architect, contractor and tradespeople to find practical and economic solutions. Services include: problem and historical investigations, conditions surveys and assessments, building and project documentation, maintenance programming and planning, project design and management, staff and worker training. Service area: United States of America.

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