
Refurbishing WOOD GUTTERS

It may be tempting to just rip them off, but wooden gutters are usually worth saving



There is a lot of practical sentiment against gutters. Wooden gutters in particular are expensive, require regular maintenance, often rot, and sometimes fall off. But they are usually well worth repairing and maintaining.

Wooden gutters were often installed on New England homes during the 19th and early 20th centuries. Even today, they are featured in some new custom homes. They are often an integral part of a building's cornice.

Function of Gutters and Cornices

To make efficient and successful repairs it is essential to know how wooden gutters function and how they are constructed.

Water drainage. Gutters are a key element in the drainage system that extends from the ridge of the roof, down the side of the building, and across the grounds. They protect siding and windows from the slow but steady damage caused by rain.

Downspouts and drainage lines prevent water buildup in the ground next to the foundation, which can cause frost damage in the winter.

The importance of this should not be underestimated. I know of a building in Portland, Maine, with a foundation wall that has buckled inward 3 1/2 inches since the gutters were removed just four years ago.

Aesthetics. The gutter acts as a crown molding that contributes to the historic character of a building. Its visual prominence defines and outlines the building.

Construction. The following drawings illustrate some of the details of wooden gutter construction.

Figure 1 shows a closed cornice with an integral gutter. If it's built like this, without ventilation, decay is certain. Decay often breaks open the interior of the cornice, dumping its load of water right where it will do the most harm. One cornice I worked on funneled water directly from the roof through the decayed sheathing to the stud space.

Figure 2 shows a mansard roof with the gutter and bed molding blocked out about 3/16-inch from the fascia. The space allows for drying. Even if the gutter leaks or overflows, structural rafters and lookouts would not be likely to decay.

In Figure 3, the cornice is on a masonry wall with a built-in gutter. A

by John Leeke

Case History: Cornice Restoration

The Hurd Manor is a large Victorian house in North Berwick, Maine. It's noted for its fine architectural detail, and is listed on the National Registry of Historic Places. The owner, David Brooks, knew he had serious maintenance problems when he found a section of wooden gutter and cornice lying on the lawn.

When we opened up the cornice (see photo, page 36) we found that moisture buildup had decayed the gutter, fascia boards, and lookouts. When the nails rusted through, the section gave way. We decided to use methods and materials that would prevent this from happening again.

The dimensions of many old cornices are not uniform, so the carpenters on this project numbered all the pieces as they took the cornice apart. This helped later in the shop when the decayed fascia and soffit boards were used as patterns to lay out and shape the new replacements.

The new boards were cut slightly oversize, then trimmed on the scaffolding for precise fit.

Custom milling of the gutter's unique profile would have been extremely expensive, so we decided to preserve the gutter with wood dutchmen and epoxies.

New lookouts were screwed onto rafter ends and toe-screwed onto



Figure B. Installing a new gutter section.

the sheathing (Figure A). Pounding nails would have caused vibration, possibly damaging the delicate slate shingles.

After fitting and trimming, the carpenters backprimed the parts before final assembly. All faces, edges, and end cuts were treated with a clear water-repellent preservative and coated with oil-base primer.

Figure B shows carpenters Craig

MacKenzie and contractor Charles Colley, of Springvale, Maine, fitting the prepared gutter onto the lookout ends.

A cornice should be vented as it is rebuilt. The easiest way is to install standard round louvered or continuous strip vents. However, these vents have a prominent visual effect that may not be acceptable on a historic house.

On this cornice, we left a space between the front edge of the soffit and the back of the lower fascia that is barely noticeable. Air moves up along the back of the gutter where it is most needed. Screening at the inside of the space keeps insects out.

The restored cornice is diagrammed in Figure C. ■

—JL

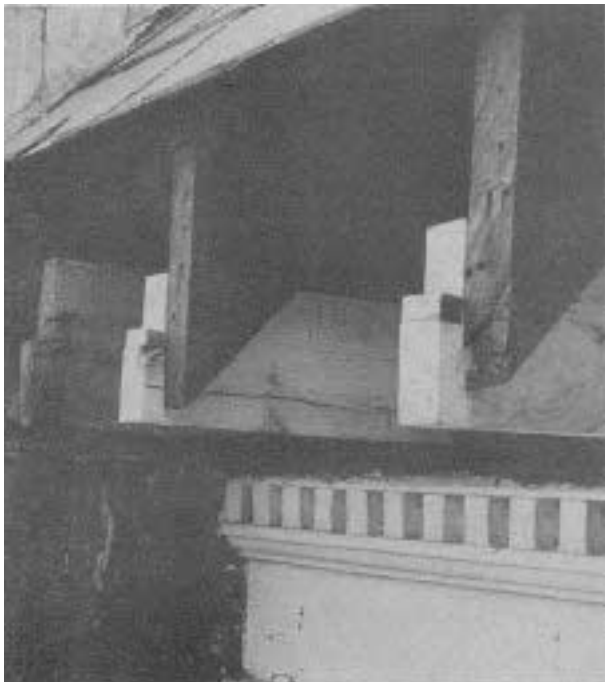


Figure A. Lookouts are notched to receive new wooden gutters.

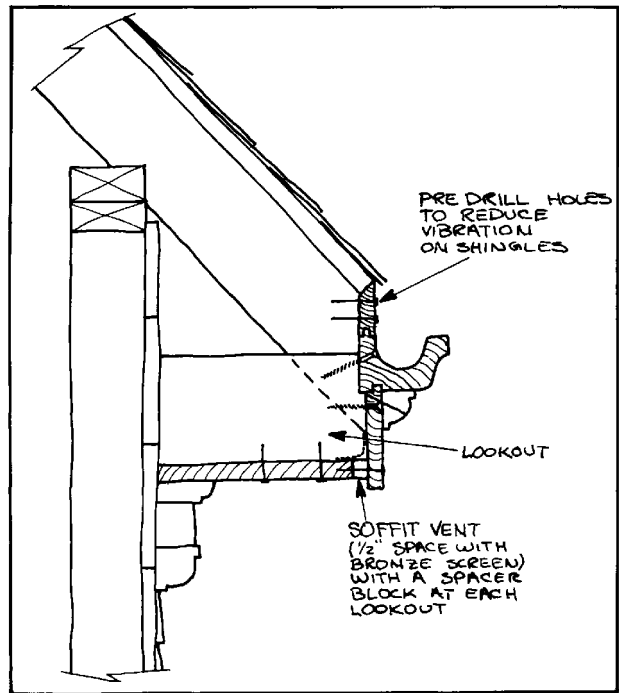


Figure C. The restored cornice of the Hurd Manor has one change from the original—soffit ventilation.

sheet-metal liner protects the structural lookout. When the liner leaks, moisture builds up in the cornice. Even if it's vented, the lookout will decay where it enters the wall. This type of gutter must be cleaned and inspected frequently.

An open cornice with added half-round metal gutter is illustrated in Figure 4. The wide roof overhang on bungalow-style houses was designed to

move water away from the building without a gutter and downspout system. Sometimes half-round metal gutters were added above entrances. Cornice decay is seldom a problem with this construction.

Assessing Conditions

Before you can decide what to do, you've got to find out what you have to work with.

A quick survey from the ground will tell you where to set up ladders for serious probing.

Look for peeling paint on gutters, fascia boards, and soffits. Green stains may be mold. Black stains could be mildew or just dirt. To tell which, just swab with a little household bleach. Mildew will lighten in color, dirt won't. Ripples in an otherwise good paint sur-

face may be caused by decayed wood compressing underneath. Grey or brownish vertical stains on fascia and frieze boards indicate water flows behind the gutter or through the cornice interior.

The next step is to clean the gutter in areas where you expect trouble. Remove all debris and loose tar or other coatings from the trough. If necessary,

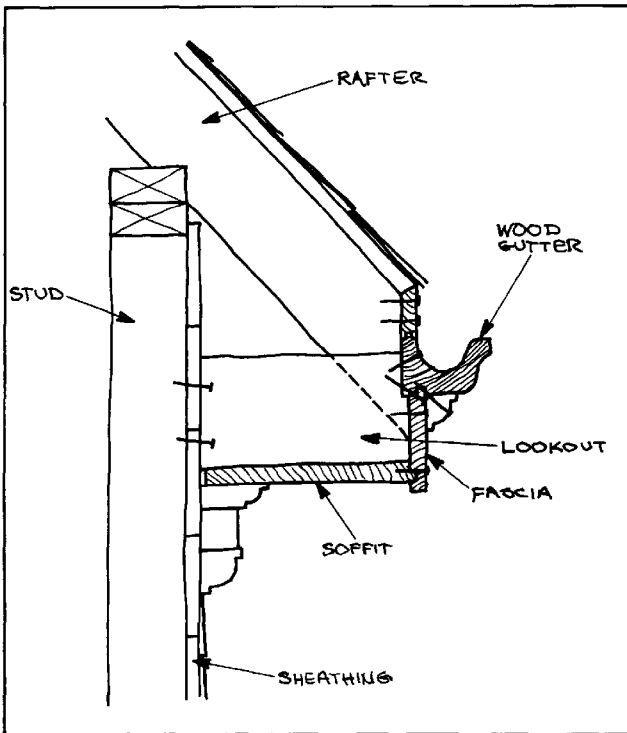


Figure 1. Closed cornice with integral gutter. As shown here, you're likely to find severe decay problems because of lack of ventilation.

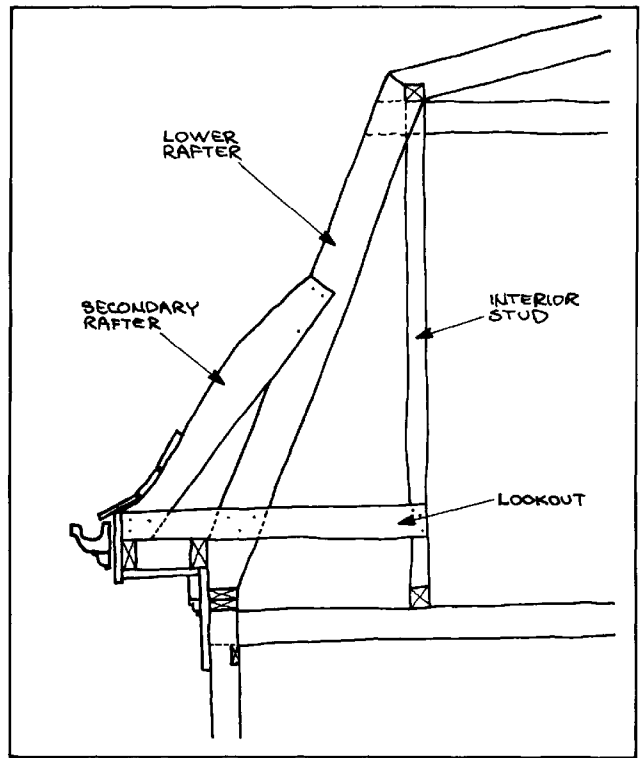


Figure 2. Mansard roof with attached gutter. This gutter is blocked out in a way that protects other components of the house from water decay.

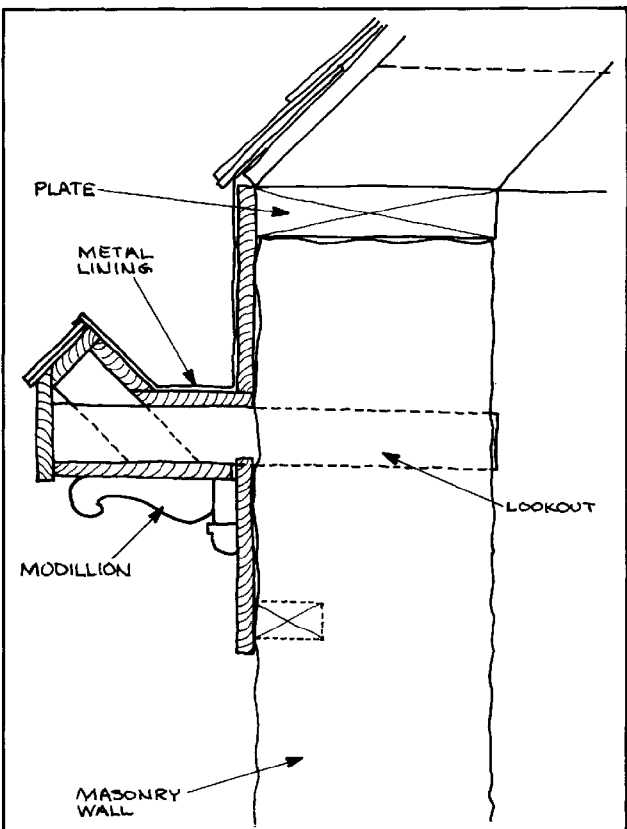


Figure 3. Cornice on masonry wall. Frequent cleaning and maintenance are needed with this configuration to prevent moisture from entering the cornice.

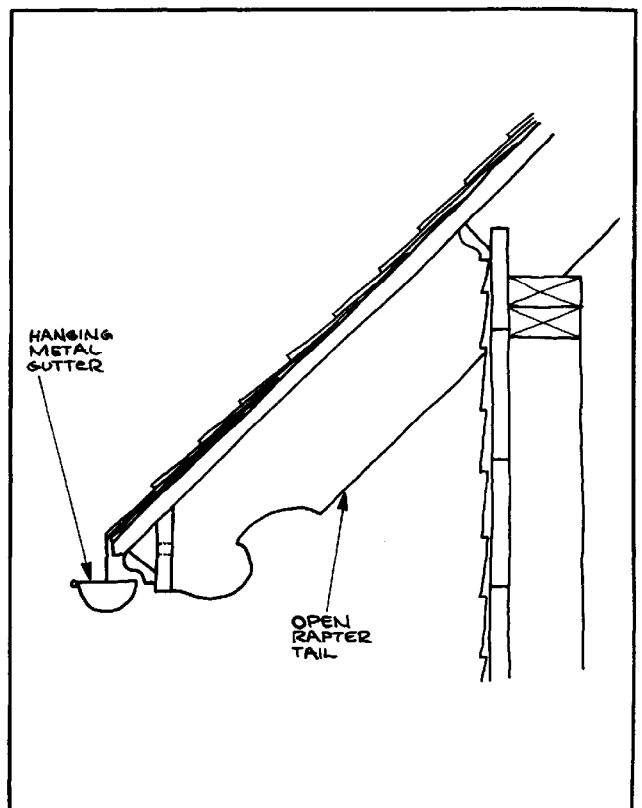


Figure 4. Open cornice with hanging half-round gutter. This detail will safely shed water that leaks or overflows the gutter.

use a hose to wash the gutter, and let it dry for a couple of days.

Then inspect carefully all likely places for deterioration, including:

- against masonry
- under sheet metal gutter liners
- under roofing tar
- the back side of the gutter
- loose flashing at gutter joints and outlets

Probe the trough with an ice pick for soft decayed wood, especially under tar and at joints.

On the north and east sides of the building, moisture and decay are often found under overhanging trees and at roof valleys. On south and west sides, warped boards and deep checks in the gutter trough are caused by the sun and alternating wet-dry cycles. The checks and cracks allow water to get inside the wood.

Butt joints are especially susceptible because the end grain readily soaks up water and can't dry out. You may never really know how extensive the damage is until you open up the cornice.

Planning the Repairs

Gutter problems always involve other parts of the house, such as the cornice, roof, and foundation. Keeping

that in mind, consider what effect your work will have on the entire house ten years or even thirty years from now.

Also, your work on the gutter may be more efficient (making the best use of scaffolding, for example) if you coordinate it with other work that is needed.

Making Repairs in Place

Gutters can often be treated and repaired in place when decay and damage are limited to the trough and outer surfaces.

Remove all tar and asphalt. This work is a pain in the neck. I have used several methods with varying degrees of success. Don't bother with any method involving heat. Chip out the tar with a gouge and mallet when it is cold and hard. I try to do this in the early spring or late fall when the weather is cold.

Chilling the tar with dry ice can be effective, but be sure to use thick insulated gloves and safety goggles.

Once I used a carbon-dioxide fire extinguisher on thin asphalt that was still flexible and beginning to peel. The CO₂ gas froze the asphalt stiff and blasted it right off.

Use a curved scraper on thin asphalt coatings that have hardened.

Dry out the wood. Most treatments

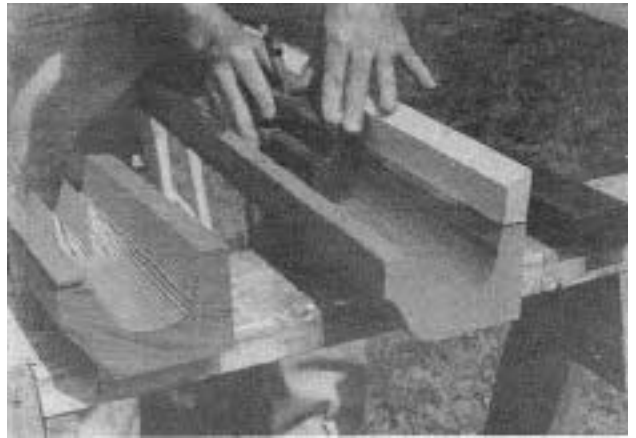


Figure 7. The author makes replacement gutter sections by ripping out the trough with a circular saw and finishing with a hand plane.

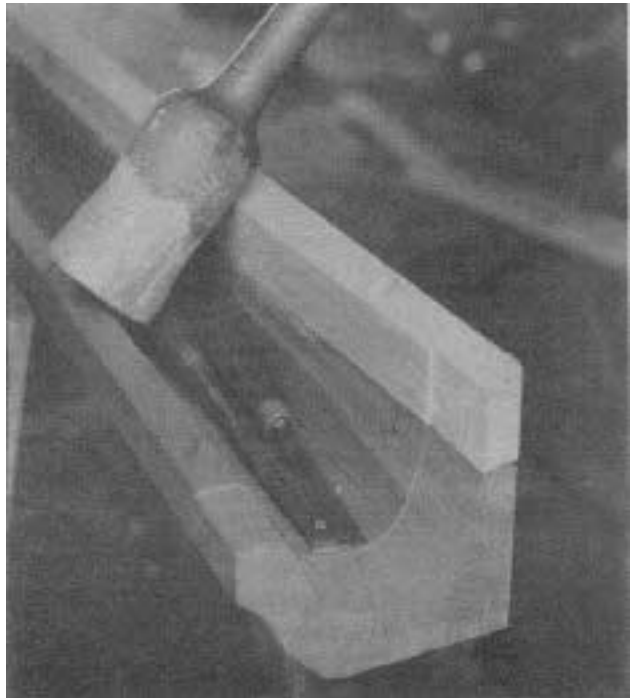


Figure 8. Chisel a depression out to recess the flashing where two sections of gutter meet.

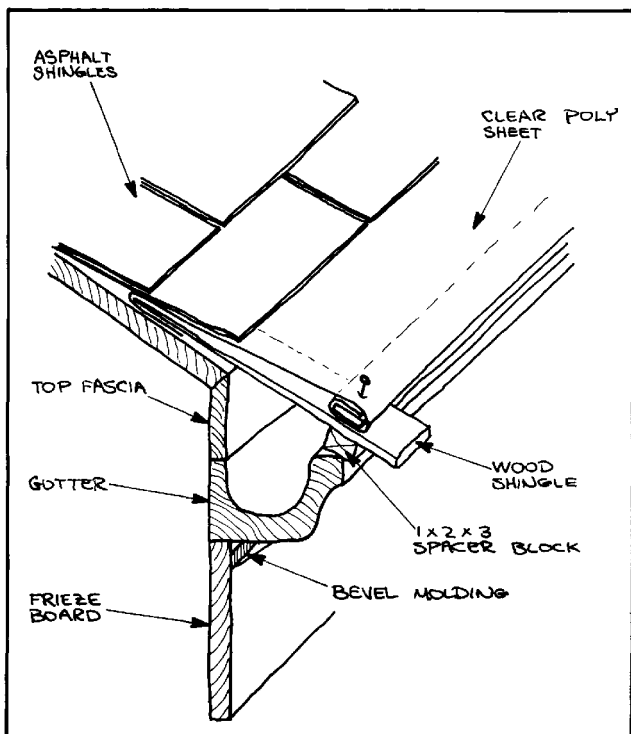


Figure 5. Temporary flashing. Waterproof protection may be needed to allow the gutter to dry out before treating it.

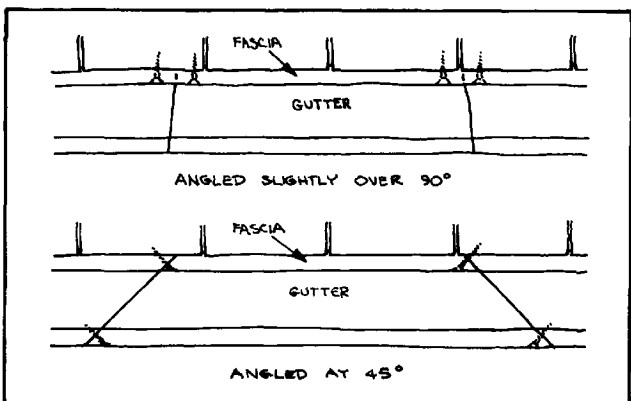


Figure 6. Two ways to cut and replace a section of gutter, viewed from above. The upper version, with angle cuts slightly over 90 degrees, will allow more convenient replacement.

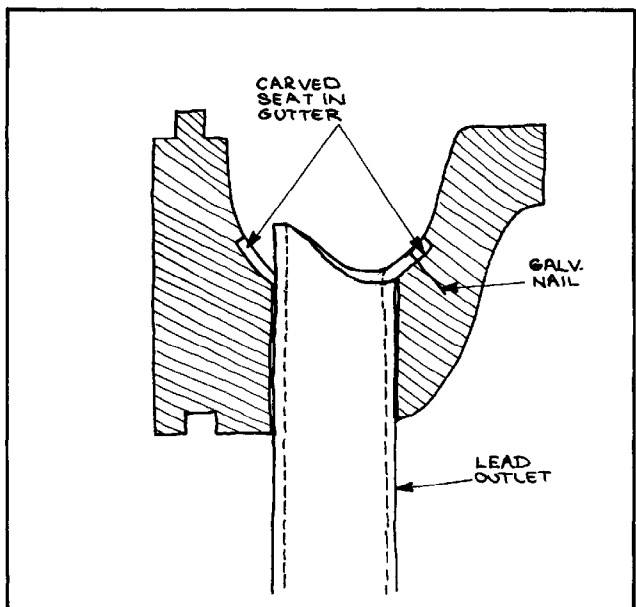


Figure 9. Install the lead outlet so that the flange is flush with the inside surface of the wooden gutter.

and adhesives require dry wood. I install temporary flashing to protect the gutter from rain showers while it dries. (See Figure 5.)

When the gutter is damp I flash it with poly-sheeting. On the ground I pre-assemble 8-foot folding sections with 4-foot lath, wood shingles, and little blocks. Up on the ladder it's a simple matter to tuck the flashing under the first course of shingles and tack the lath and spacer block to the front lip of the gutter. The clear sheeting lets the sun dry out the gutter and the wind blows the moisture out through the space between the lip and the lath.

It might take three or four weeks to dry out, a really damp gutter. If the gutter is already fairly dry I just use aluminum rolled flashing to keep it that way.

Using dutchmen. These are glued-in pieces of wood shaped to fit. A common approach is to cut decayed sections back to solid wood, and rebuild with new wood. Use the same kind of wood and align the grain and annual rings. This eliminates stress in the glue joint caused by differences in moisture expansion.

Use a waterproof glue like West System's epoxy or Elmer's WeatherProof formaldehyde-resorcinol. Resorcinol glues require high clamping pressures for good performance. Epoxy-glued parts can be tacked in place with nails or screws.

Epoxy. Decayed sections and weather cracks can be primed with epoxy consolidant and filled with epoxy filler. Consolidant is a two-part mixture that soaks into decayed wood and then hardens, restoring the wood to near-original strength.

The wood must be very dry (15 percent moisture content or less) for the epoxy to soak in properly. If there is moisture inside the decayed area, epoxy can trap it there, promoting further decay.

I drill holes in a honeycomb pattern over the decayed area, to give it access

to end grain where it soaks in readily, then add consolidant until no more soaks in: Once the consolidant has set, I build the area back up to the original surface contours with epoxy filler.

Epoxy materials are expensive (\$50 to \$65 per gallon). But when only a small part of the gutter is decayed, that's a low price compared to the setup costs of custom milling a reproduction.

Section cuts and replacements. If decay in the trough is extensive or penetrates to the back of the gutter, it will have to be removed. On attached gutters you can usually saw out a section, leaving the rest of the gutter in place.

I usually cut at an angle slightly wider than 90 degrees (Figure 6, top). The wider front opening makes it easier to set the new section in place. I then use epoxy adhesives to hold the new section.

I find this easier than the practice of some carpenters who make a 45-degree cut (Figure 6, bottom), and use screws and ordinary exterior glue to hold the new section in place.

To make a new section of gutter, first square up a block of wood. Scribe the matching gutter profile on each end. Rip out the trough with alternating bevel cuts on a table saw. Finish up the trough and outside curves with hand planes. The 6-foot section shown in Figure 7 took four hours to make.

Flashing

I flash all butt and miter joints with three-pound sheet lead. I start by forming a 4-inch wide lead strip to the contour of the gutter trough so that it laps over the joint by 2 inches on each side. Then I scribe the wood surface along the edge of the lead and carve out a depression so that the lead sits flush with the trough surface. (Figure 8.) Without a depression, the flashing will form a tiny dam that will trap water, causing decay under the flashing. I then seal the lead with caulk and fasten it in place with galvanized or lead-coated copper nails.

Outlets

Lead pipe is easily formed into a leak-proof outlet. I can usually find thick-walled lead pipe right on the project when old sinks are ripped out.

First, I drill a hole in the gutter about 1/8 inch larger than the pipe. With a ballpeen hammer I form a 1/2-inch lip on one end of the pipe, and shape it to lie flat on the trough bottom. Then I scribe

A tarred gutter can't be inspected to determine what is happening to the wood. When the tar leaks, it traps moisture against the wood causing decay. Finding a section of rotted gutter in the yard may be your first sign of a problem.

Now I usually recommend only a penetrating preservative treatment that protects the wood, yet lets it breathe.

Penetrating treatments. Penetrating treatments soak into the trough, so they can't peel up like paint or tar and trap moisture beneath. They repel water when it rains, yet allow water vapor to escape in dry weather.

Some solutions, like linseed oil, have high solids content, so more of the product is left in the wood. Others, like Woodlife, are mostly solvent which evaporates, leaving less product on the wood. You get more for your money and effort if you use a solution that is high in solids.

The table shows a few of the possibilities and some of their characteristics.

Often, the best solution is to mix your own special treatment formula (see "Recipe for Wood Treatment").

Don't use tar. Many of the wooden gutters I have worked on were coated in the trough with roofing tar or asphalt. In every case moisture was trapped beneath, causing decay, as shown in Figure 10.

Why are so many wooden gutters treated ineffectively with tar? It's often hastily done as add-on work by a roofer who is already concentrating on his

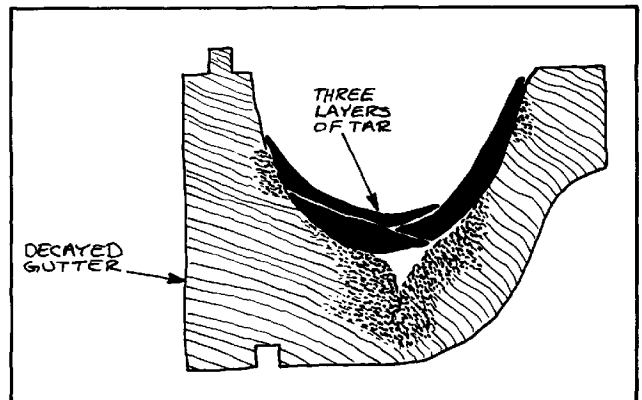


Figure 10. Tar coating of wood gutters is popular, but typically leads to decay.

the trough and carve a depression to allow the lip to sit flush with the surface. Finally, I seal the lip in place with caulk, and fasten with 1-inch galvanized steel or lead-coated copper nails. A flush lip lets all the water drain quickly (see Figure 9, preceding page).

Caulk

Silicone caulk works well for flashing and outlets. However, it's difficult to paint over. In the last few years, I've used polyurethane caulk, such as Sikaflex, which seems to overcome that problem. It has a durability rating of 15 to 20 years.

Protective Gutter Treatments

If a wooden gutter has a chance to dry out after each rain, it will not decay. I have seen gutters over 100 years old in perfect condition.

Any truly waterproof coating in the trough will cause problems, as it will trap moisture when it breaks down.

I used to recommend painting with waterproof aluminum-pigment paint. On one project the carpenters gave the wood a flowing coat of Cuprinol Clear before the paint. After two years, the aluminum paint peeled up in large sheets, trapping debris and moisture beneath. Similar problems would be caused by a sheet metal liner.

next job.

A tarred gutter can't be inspected to determine what is happening to the wood. When the tar leaks—and it eventually will—it traps moisture against the wood causing decay. Finding a section of rotted gutter lying in the yard may be your first opportunity to know there's a problem.

Maintenance

Once the gutters are in good condition you (or your clients) will want to keep them that way with regular maintenance.

Trees that drop seeds and leaves onto the roof should be cut back. Debris should be cleaned out as often as the gutters become clogged—at least once a year. The wood surface of the trough must be exposed to free air for quick drying.

The trough should be re-treated when it dries out and begins to check, or when mold and mildew reappear—at least every five to ten years.

When I talk about maintenance, I often hear the following argument: "In the 'real world,' maintenance just doesn't happen, so we should eliminate high maintenance building elements like gutters."

But preserving a historic building is, by definition, protecting and maintain-

Recipe for Wood Treatment

Although various standard treatment formulas are discussed in the accompanying article, I often find it's better to mix my own. That makes it possible to vary the ingredients to suit different conditions, and to provide balance so that different areas will need renewal at about the same time.

The ingredients I use are:

- A wood preservative such as Lynch Wood Preservative, consisting of 21 percent zinc naphthenate in mineral spirits. The zinc naphthenate kills mold and mildew.
- Paraffin, to resist water at the surface of the wood.
- Naphtha, to dissolve the paraffin.
- Raw linseed oil, to consolidate the surface.
- Pigment, such as black or brown masonry pigment, for areas that need additional protection from ultraviolet deterioration.
- Mildewcide paint additive, such as Super Di-All, for areas that need additional protection from mildew.

I start by loosening the lid on a gallon can of wood preservative, and warming it in the sun or in a

bucket of hot tap water. A warm solution helps in mixing or penetration. Please note that warm is good enough. Don't use direct heat or a double boiler. The materials have a low flash point (140 to 190°F) and can explode in your face!

Then I shave a baseball-size chunk of paraffin into two cups of naphtha. When the paraffin is dissolved, I stir it into the preservative.

That is the basic formula. The other ingredients vary according to the part of the gutter you are treating.

South and west gutters often have a frayed porous surface, due to constant exposure to the sun. For these areas, I add up to a gallon of raw linseed oil, and 1/4-cup pigment. Before using this mixture, be sure the downspouts are in place, so the wash-off doesn't stain a white wall below.

North and east gutters are more susceptible to mold and mildew, so deep penetration is important. Therefore, I add only a 1/2-ounce or less of raw linseed oil, and about an ounce of mildewcide paint additive. ■

—JL

Historic buildings often require—and deserve—more maintenance than other types of structures. If a building owner requires low maintenance, a historic building may not be for him.

ing it. Most of the deterioration is caused by water and movement. Roth of these destructive forces combine in gutters. This is why gutters command so much of our attention, and why they are worth so much thought and effort.

Historic buildings often require (and deserve) more maintenance than other types of structures. If you require low maintenance, a historic building may not be for you.

Many owners of historic buildings are aware of the value of the cultural resource they manage. For a few of us this extends to a feeling of stewardship—caring for the building to pass it on to future generations. Our reward is that nagging refrain: "Get out there and clean those gutters!" ■

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Suppliers

Suppliers of epoxy consolidant and filler:

Abatron, Inc.
33 Center Drive
Gilberts, IL 60136
312/426-2200

Conservation Services
8 Lakeside Trail
Kinnelon, NJ 07405
201/838-6412

Wood gutter suppliers in author

Leeke's area:
Littlefield Lumber
299 Vaughn
Portsmouth, NH 03801
603-436-3211
(Factory-made, will ship anywhere in New England)

Windham Millworks
P.O. Box 720
North Windham, ME 04062
207/892-4055
(Custom shaped wood gutters)

Comparison of Gutter Finishes

Type	Cost	Brand Names	Solids	Life	Application	Recommendation
Raw Linseed Oil	\$10-\$15/ Gallon	Many brands	High	Will remain in the wood for years.	Brush or pour on to soak. Never fully hardens, allowing deep penetration.	Use in arid regions or on south and east side of house. Susceptible to mold and mildew.
Wood Preservative	\$15-\$22/ Gallon	WoodLife, Cuprinol Clear	Low	Weathers away; Renew every 3 to 5 years	Brush or pour on to soak. Mineral spirits carry solids and chemicals into cracks and pores, then evaporate.	Excellent for damp sites, east and north sides of hours.
Epoxy Consolidant	\$40-\$60/ Gallon	LiquidWood, Git Rot	High. All resin will remain in wood.	Long life. Completely water-, moisture-, and decay-proof	Takes special knowledge. For best results, see text.	Not recommended for general use in gutter trough: can trap moisture and cause decay. Recommended for solidifying localized decayed wood only.
Boiled Linseed Oil	\$10-\$15/ Gallon					Not usually recommended. May harden too quickly, forming a skin at surface.
Used Gear Oil (from auto transmissions)	Free or Cheap			Long life, does not harden		Not recommended. Highly water repellent, but may keep paint from adhering to outside of gutter.
Used Crankcase Oil (from auto engines)	Free or Cheap					Not recommended. May contain acids that attack wood.