

5.9 Roof Technical Guidelines



A weather-tight roof is basic in the preservation of a structure, regardless of its age, size, or design. In the system that allows a building to work as a shelter, the roof sheds the rain, shades from the harsh sun, and buffers the weather.

During some periods in the history of architecture, the roof imparts much of the architectural character. It defines the style and contributes to the building's aesthetics. The hipped roofs of Georgian architecture, the turrets of Queen Anne and the graceful slopes of the Bungalow designs are examples of the use of roofing as a major design feature.

But no matter how decorative the patterning or how compelling the form, the roof is a highly vulnerable element of a shelter that will inevitably fail. A poor or unmaintained roof will permit the accelerated deterioration of historic interior building materials - masonry, wood, plaster, paint - and will cause general disintegration of the basic structure. Furthermore, there is an urgency involved in repairing a leaky roof since such repair costs will quickly become prohibitive. Although such action is desirable as soon as a failure is discovered, temporary patching methods should be carefully chosen to prevent inadvertent damage to sound or historic roofing materials and related features.

Before any repair work is performed, the historic value of the materials used on the roof

5.9.1 INTRODUCTION

should be understood. Then a complete internal and external inspection of the roof should be planned to determine all the causes of failure and to identify the alternatives for repair or replacement of the roofing.

The essential ingredients for maintaining and replacing a historic roof are:

- 1) understanding the historic character of the building and being sympathetic to it,
- 2) careful examination and recording of the existing roof and any evidence of earlier roofs,
- 3) consideration of the historic craftsmanship and detailing and implementing them in the renewal wherever visible,
- 4) supervision of the roofers or maintenance personnel to assure preservation of historic fabric and proper understanding of the scope and detailing of the project,
- 5) consideration of alternative materials where the original cannot be used,
- 6) regular maintenance program to assure that the building owner or staff understands how to take care of the roof and of the particular trouble spots to safeguard.

With these points in mind, it will be possible to preserve the architectural character and maintain the physical integrity of the roofing on a historic building.

5.9.2 PHYSICAL EVALUATION

An important step to maintaining the roof of a commercial or residential building is the identification and evaluation of existing roof's construction type, structural stability of the roof structure, architectural features and roof materials.

Roof failures may be categorized into two groups – those that require routine maintenance or replacement of roofing materials, and those that are more complex and require professional assistance.

Routine maintenance roof repairs or replacement may include damaged roof shingles, a roof shingle that has fallen from its location, or replacement of the roof due to its age.

If the roof problem is more complex than this, it may be necessary to contact a professional, either an architect, a reputable roofing contractor, or a craftsman familiar with the inherent characteristics of the particular roofing system involved. These professionals may be able to advise on immediate patching procedures and help plan more permanent repairs.

A thorough examination of the roof should start with an appraisal of the existing condition and quality of the roofing material itself. Particular attention should be given to any southern slope because year-round exposure to direct sun may cause it to break down first.

Support Systems Evaluation: Once the condition of the roofing material has been determined, the related features and support systems should be examined on the exterior and on the interior of the roof. The gutters and downspouts need periodic cleaning and maintenance since a variety of debris fill them, causing water to back up and seep under roofing units. Water will eventually cause fasteners, sheathing, and roofing structure to deteriorate. Although unlikely in north Texas, the daily freeze-thaw cycles in winter can cause ice floes to develop under the roof surface. The pressure from these ice floes will dislodge the roofing material, especially slates, shingles, or tiles.

Many commercial buildings have built-in gutters set within the perimeter of the roof. The downspouts for these gutters may run within the walls of the building, or drainage may be through the roof surface or through a parapet to exterior downspouts. These systems can be effective if properly maintained; however, if the roof slope is inadequate for good runoff, or if the traps are allowed to clog, rainwater will form pools on the roof surface. Interior downspouts

can collect debris and thus back up, perhaps leaking water into the surrounding walls. Exterior downspouts may fill with water, which in cold weather may freeze and crack the pipes. Conduits from the built-in gutter to the exterior downspout may also leak water into the surrounding roof structure or walls.

Failure of the roof flashing is usually a major cause of roof deterioration. Flashing should be carefully inspected for failure caused by either poor workmanship, thermal stress, or metal deterioration (both of flashing material itself and of the fasteners). With many roofing materials, the replacement of flashing on an existing roof is a major operation, which may require taking up large sections of the roof surface. Therefore, the installation of top quality flashing material on a new or replaced roof should be a primary consideration. Remember, some roofing and flashing materials are not compatible.

5.9.3 REPLACING THE HISTORIC ROOFING MATERIAL

With some exceptions, most historic roofing materials are available today. If not, an architect or preservation group who has previously worked with the same type material may be able to recommend suppliers. Special roofing materials, such as tile or embossed metal shingles, can be produced by manufacturers of related products that are commonly used elsewhere, either on the exterior or interior of a structure. With some creative thinking and research, the historic materials usually can be found.

Replacing Historic Wood Shingles: Wood shingle roofs are important elements of many historic buildings. The special visual qualities imparted by both the historic shingles and the installation patterns should be preserved when a wooden shingle roof is replaced. This requires an understanding of the size, shape, and detailing of the historic shingle and the method of fabrication and installation. These combined to create roofs expressive of particular architectural styles, which were often influenced by regional craft practices.

Wood shingle roofs need periodic replacement. They can last from 15 to over 60 years, but the shingles should be replaced before there is deterioration of other wooden components of the building. Appropriate replacement shingles are available, but careful research, design, specifications, and the selection of a skilled roofer are necessary to assure a job that will both preserve the appearance of the historic building and extend the useful life of the replacement roof. Commercially available modern shingles and shakes are for the most part machine-made.

Replacement roofs must comply with local codes which may require, for example, the use of shingles treated with chemicals or pressure-impregnated salts to retard fire. These requirements can usually be met without long-term visual effects on the appearance of the replacement roof.

Method of manufacture: While commercially available shakes are promoted by the industry as handsplit, most are split by machine (this reduces the high cost of hand labor).

Coatings and Treatments: Shingles may be treated to obtain a fire-retardant rating; to add a fungicide preservative (generally toxic); to revitalize the wood with a penetrating stain (oil as well as water based); and to give color.

Penetrating stains and water repellent sealers are sometimes recommended to revitalize wood shingles subject to damage by ultraviolet rays. Some treatments are oil-borne, some are waterborne, and some are combined with a fungicide or a water repellent. If any of these treatments is to be used, they should be identified as part of the specifications. Manufacturers should be consulted regarding the toxicity or other potential complications arising from the use of a product or of several in combination. It is also important not to coat the shingles with vapor impermeable solutions that will trap moisture within the shingle and cause rotting from beneath.

Alternative Roof Materials: The use of the historic roofing material on a structure may be restricted by building codes or by the availability

of the materials, in which case an appropriate alternative will have to be found. In a rehabilitation project, there may be valid reasons for replacing the roof with a material other than the original. The historic roofing may no longer be available, or the cost of obtaining specially fabricated materials may be prohibitive. But the decision to use an alternative material should be weighed carefully against the primary concern to keep the historic character of the building.

If the roof is flat and is not visible from any elevation of the building, and if there are advantages to substituting a modern built-up composition roof for what might have been a flat metal roof, then it may make better economic and construction sense to use a modern roofing method. But if the roof is readily visible, the alternative material should match as closely as possible the scale, texture, and coloration of the historic roofing material.

Fire-retardant, treated wood shingles are currently available. The treated wood tends, however, to be brittle, and may require extra care (and expense) to install. In some instances, shingles laid with an interlay of fire-retardant building paper may be an acceptable alternative. As an alternate, asphalt shingles or ceramic tiles are common substitute materials intended to duplicate the appearance of wood shingles, slates, or tiles.

Lead-coated copper, terne-coated steel, and aluminum/zinc-coated steel can successfully replace tin, terne plate, zinc, or lead. Copper-coated steel is a less expensive (and less durable) substitute for sheet copper.

5.9.4 TEMPORARY STABILIZATION

It may be necessary to carry out an immediate and temporary stabilization to prevent further deterioration until research can determine how the roof should be restored or rehabilitated, or until funding can be provided to do a proper job. A simple covering of exterior plywood or roll roofing might provide adequate protection, but any temporary covering should be applied with caution. One should be careful not to overload the roof structure, or to damage or destroy historic evidence or fabric that might be

incorporated into a new roof at a later date. In this sense, repairs with caulking or bituminous patching compounds should be recognized as potentially harmful, since they are difficult to remove, and at their best, are very temporary.

5.9.5 ROOF ACCESSORIES AND APPURTENANCES

Thought should be given to the design and placement of any modern roof appurtenances such as plumbing stacks, air vents, or TV antennas. Consideration should begin with the placement of modern plumbing on the interior of the building, otherwise a series of vent stacks may pierce the roof membrane at various spots creating maintenance problems as well as aesthetic ones. Air handling units placed in the attic space will require vents which, in turn, require sensitive design. Incorporating these in unused chimneys has been very successful in the past.

Whenever gutters and downspouts are needed that were not on the building historically, the additions should be made as unobtrusively as possible, perhaps by painting them out with a color compatible with the nearby wall or trim.

5.9.6 MAINTENANCE OF THE ROOF

Although a new roof can be an object of beauty, it will not be protective for long without proper maintenance. The purpose of regular or routine maintenance is to extend the life of the roof. The roof must be kept clean and inspected for damage both to the shingles and to the flashing, sheathing, and gutters. At least twice a year, the roof should be inspected against a checklist. All changes should be recorded and reported.

Wood and asphalt shingles should be inspected quarterly for damage or deterioration; it is much easier (and cost effective) to replace individual shingles before they have failed and resulted in leaking in the building. Foot traffic that may be required for the maintenance of the roof should be limited to avoid excessive damage to the roof surface. If exterior work ever requires hanging scaffolding, use caution to insure that the anchors do not penetrate, break, or wear the roofing surface, gutters, or flashing.



**OLDER 'DIAMOND' PATTERN
COMPOSITION ROOF w/ AREAS OF
FAILURE**

Keeping the roof free of debris is important. This may involve only sweeping off pine needles, leaves and branches as needed. It may involve trimming overhanging branches. Other aspects of maintenance, such as removal of moss and lichen buildup, are more difficult. While they may impart a certain charm to roofs, these moisture-trapping organisms will rot the shingles and shorten the life of the roof. Buildups may need scraping and the residue removed with diluted bleaching solutions (chlorine), although caution should be used for surrounding materials and plants.

Some roofers recommend power washing the roofs periodically to remove the dead wood cells and accumulated debris. While this makes the roof look relatively new, it can put a lot of water under wood or asphalt shingles, and the high pressure may crack or otherwise damage them. The added water may also leach out applied coatings.

In addition, gutters tend to accumulate leaves and debris during the spring and fall and after heavy rain. Hidden gutter screening both at downspouts and over the full length of the gutter could help keep them clean. The surface material would require checking after a storm as well. Periodic checking of the underside of the roof from the attic after a storm or winter freezing may give early warning of any leaks. Generally, damage from water or ice is less likely on a roof that has good flashing on the outside and is well ventilated and insulated on the inside.