



ROOF DESIGN & CONSULTING SERVICES, INC.

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ROOF REPLACEMENT? ROOF RECOVER? OR ROOF REPAIR?

The Fundamentals of Reroofing and a Guide to Decision Making

ABSTRACT:

Every roof ultimately requires re-roofing. However, the method and extent of reroofing can only be determined by a qualified Design Professional who can investigate the existing system and answer questions for the owner concerning code, cost, and technical issues. The design professional may also eliminate false or misleading assumptions, such as incorrectly attributing water infiltration to the roof system when the water is actually entering the building through the adjacent exterior walls. Many factors affect the decision of when maintenance and repair treatments become unsound economically and re-roofing is required. The most important are:

- existing conditions
- age of roofing
- unusual exposure conditions such as hail or strong winds
- previous maintenance and repair or lack thereof
- current and possible future use of the structure
- appearance and building aesthetics
- building code requirements

It is only by weighing all of the pertinent factors that a proper decision can be made. Re-roofing is generally a replacement in kind. However, it is essential that re-roofing include corrective action to remedy design or construction deficiencies if they exist. Also, reroofing provides the opportunity to take advantage of improved materials, methods, and techniques.

ROOFING OPTIONS:

In general, three (3) options for roofing remediation can be considered:

- (1) **REPAIR** – Correct selected problems or deficiencies in the roof system, leaving the existing roof(s) in place as the primary weathershield. Repair is the restoration of a facility by over-haul, re-processing, or replacement of constituent parts or materials, which cannot be corrected through routine maintenance. Roof repair must be distinguished from roof maintenance and is defined as the treatment given a roof following at least partial failure. Roof repairs are permitted by code, and no scope or size of the repair is stipulated. In our opinion, the REPAIR option is intended to correct limited deficiencies without a full tear-off, recover, or replacement. For example, when the causes of damage to a roof membrane are from impact, an isolated incident of poor installation, or some other nonsystemic cause, repairs can be performed to any component of the roof system with replacement in kind. In those cases, once the roof is repaired, the performance of the roof and its anticipated remaining lifespan will continue. Repairing an existing roof membrane or replacing sections or parts of a roofing system become difficult to justify if the deterioration leading to the need for a repair is due to long-term exposure to the elements or the advanced age of the roof.

- (2) **RECOVER** – Cover the existing system with a new roof system, leaving the original roof in place. The new roof system may be a single roof covering or multiple components such as insulation, coverboard, membrane, flashing and trim. Sometimes referred to as “retrofitting,” the design should take into consideration that moisture or other detrimental conditions may be present in the existing roof system. As with repairs, any recover must determine the substrate conditions present under the existing system. If unsuitable conditions are covered or enclosed, significant additional structural, thermal, and environmental degradation can continue. The major advantage RECOVER is the cost savings associated with not having to remove and dispose of the existing roof membrane. Most building codes stipulate that no more than two roof systems may be in place, primarily due to the danger of structural overloading. Further, wind, fire, and thermal resistance of the existing system as well as the new system must be included in the design of a recover.
- (3) **REROOF** – This option requires total removal of the existing roof down to sound substrate. Reroofing allows for correction of all deficiencies in the original roof system including related components such as deteriorated roof deck. The existing deck may be examined for structural integrity; and the replacement or repairs necessary before installation of a new roofing system may be identified. The design must facilitate positive drainage, eliminate standing water, provide adequate thermal insulation, and correct related problems such as flashings.

The complete removal and replacement of an existing roofing system is warranted if one or more of the following situations exist:

- Tear-off is mandated by the building code.
- The existing roofing system has deteriorated beyond being serviceable as a substrate for a recover system.
- There is extensive moisture below the membrane.
- The existing roof system attachment cannot provide the wind up-lift resistance or fire protection required for the new roof assembly.
- There is significant deterioration to the underlying structural deck.
- The existing roof assembly is known to contain materials which may pose health, environmental, or occupational hazards.

WHAT DOES THE BUILDING CODE SAY ABOUT REROOFING?

Because a large number of reroofing and re-cover projects are undertaken without a licensed design professional's involvement, it is important to know building code requirements that apply to such projects. Building codes provide some guidance and controls for roofing - both new construction and roof system re-cover and replacement projects.

The International Building Code (IBC) defines roofing terms and activities in Chapter 2 :

ROOF ASSEMBLY (For application to Chapter 15 only).

A system designed to provide weather protection and resistance to design *loads*. The system consists of a *roof covering* and *roof deck* or a single component serving as both the roof covering and the *roof deck*. A roof assembly includes the *roof deck*, *vapor retarder*, substrate or thermal barrier, insulation, *vapor retarder* and *roof covering*.

ROOF COVERING. The covering applied to the *roof deck* for weather resistance, fire classification or appearance.

ROOF RECOVER. The process of installing an additional *roof covering* over a prepared existing *roof covering* without removing the existing *roof covering*.

ROOF REPAIR. Reconstruction or renewal of any part of an existing roof for the purposes of its maintenance.

ROOF REPLACEMENT. The process of removing the existing *roof covering*, repairing any damaged substrate and installing a new *roof covering*.

IBC Chapter 15 governs Roof Assemblies and Rooftop Structures, and Section 1510 specifically addresses Reroofing.

1510.3 Recovering versus replacement. New roof coverings shall not be installed without first removing all existing layers of roof coverings down to the roof deck where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of roof covering.

Exceptions:

1. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
2. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 1510.4.
3. The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.

Section 1510.5—Reinstallation of Materials dictates which roofing materials can be reused in reroofing situations. Existing slate and clay and concrete tile can be reused except when damaged, cracked or broken. Existing vent flashings, metal edge flashings, drain outlets, collars and metal counterflashings can be reused when they are not rusted, damaged or otherwise deteriorated. Aggregate-surfacing materials are not permitted to be reused.

IBC Section 104.11—Alternative Materials, Design and Means of Construction and Equipment gives code officials the authority to approve alternative designs, materials or methods of construction not specifically provided for or permitted by the code as long as they meet the code's intent.

In conclusion, the decision to repair, recover, or replace can be made only if all existing physical conditions are known and the desired level of roof performance is understood. Consider the potential risks and benefits to the occupants, building, and operations. And above all, make sure that the client is aware of the reasons behind the decision and is aware of how the present decision will impact future reroofing.

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