

# *When Is It Safe To Re-Cover An Existing Roof?*

AT FIRST LOOK, THE ADVANTAGES SEEM  
OVERWHELMING.  
BUT IF THE ISSUE IS NOT CAREFULLY THOUGHT  
OUT AND THE RAMIFICATIONS THOROUGHLY  
CONSIDERED, THE SITUATION  
CAN BE DEADLY.

By  
**Karen Warseck, AIA**

**M**ost roofing systems manufacturers state in their sales literature that their product can be used, in some cases, to re-cover an existing roof. At first look, the advantages appear overwhelming. The owner saves the cost of tear-off. The noise, dirt and inconvenience of tear-off are eliminated. The building remains somewhat watertight during the installing of the new roof. Normal operations are less disturbed by the roofing work.

All these are very compelling arguments.

However, the realities of the situation require careful consideration. First of all, the reason roof replacement is under consideration is because the existing system leaks. Almost never is a roof considered for major work simply because it has exceeded its projected life span. More likely, it has leaked and been patched on many occasions over a long period of time. This means that water has entered the existing system and is probably being retained in the insulation.

Thus, in a typical re-roofing situation, there are various degrees of wet insulation under a membrane of dubious integrity. Logically, this is not the best substrate in which to attach a new and expensive roof.

Furthermore, manufacturers will not warranty an installation over a wet or faulty substrate. Unfortunately, "faulty" is usually not defined until warranty repairs are required.

## **Life Safety Problems**

The water entrapped in the existing system can do a lot worse than void a warranty. If the deck is steel, wood, wood fiber or gypsum, the moisture can cause potential life safety problems due to rusting through a steel deck or rotting of wood or wood fiber.

Gypsum decks will turn into powder when constantly exposed to moisture. Composite decks of gypsum mechanically fastened to steel are especially susceptible to moisture damage. The gypsum will deteriorate when wet, the fasteners corrode, and, because the steel deck in these systems is extremely thin, it will rust through that much more quickly.

Even concrete decks, although less susceptible to damage, are not immune. Since wet insulation has no insulating value, the concrete deck below can be subjected to freeze/thaw damage. Any cracks in the concrete can let water in to the reinforcing steel, causing corrosion and possibly spalling the deck. Lightweight insulating concrete fill will deteriorate rapidly under freeze/thaw cycling, with the result that it becomes the consistency of beach sand. Because there is no way of fastening to such deteriorated fill, complete removal is required, at a premium cost.

### **Existing moisture could possibly prevent any adhered system from bonding to the original substrate**

Unless the existing roof is removed, there is virtually no way of knowing the condition of the deck underneath it. Simply looking at the deck from below may not uncover the hazards -- decks deteriorate from water coming in from above, not below. Think of the potential liability if someone should fall through a deteriorated deck!

### **Inherited Moisture Problems**

In addition to life safety hazards due to deck deterioration, moisture in the existing roof can cause problems with the new system. The new roof may appear to be leaking, when in fact, the moisture is trapped in the old one and finding its way through the deck. Impervious re-cover membranes such as built-up, modified bitumen or coated polyurethane foam will blister if installed over a moisture-laden substrate. These blisters are easily broken by foot traffic, allowing water into the new roof.

Because adhesion of roofing materials is adversely affected by dampness, existing moisture may prevent any adhered system from bonding to the substrate. The weight of the water trapped in the existing insulation may also cause the new re-cover to exceed the design load of the roof assembly, eventually causing structural failure.

Re-cover recommendations generally require either removal of gravel on a built-up roof and installation of a re-cover board or insulation over the existing surface. If the roof membrane or insulation are to be directly adhered to the substrate, incomplete removal of gravel, or dirt left on the substrate, can interfere with adhesion and increase the opportunity for a blow-off.

In most cases, however, the new insulation or re-cover board is mechanically fastened to the substrate. Mechanical fasteners, piercing through wet insulation, will eventually rust. Even if they are specially coated to resist rusting, steel deck at the fastener holes is not. As the steel around the fastener rusts away, the hole enlarges. Whether it is the deck or the fastener that rusts, the fasteners will no longer be held in place by the deck. As a result, they can easily be pulled out, thereby vastly increasing the opportunity of a roof blow-off.

In any case, fasteners penetrating the substrate on a re-cover provide a channel

for entrapped moisture through the deck into the occupied space.

With all the problems that can result from wet insulation, logic dictates the removal of the moisture from the existing substrate. One popular way is to attempt to dry out the insulation by the installation of roof vents. Unfortunately, roof vents do virtually nothing to remove trapped water from saturated insulation. While they don't dry wet insulation, they may be helpful (and this has not been proven) in relieving vapor pressure in damp insulation. If the moisture is trapped between plies in a built-up roof, or in open cells in a closed cell insulation, vents will do no good at all because they rely on vapor migration to relieve pressure.

## Selective Tear-Off

Another way is to selectively tear off parts of the roof. However, this can cause more problems than it helps solve. By doing any tear-off, the building interior is still exposed to the weather, noise, dirt and cost of tear-off. Thus, the original reasons for not contemplating tear-off are negated. Another potential problem is that a clear determination of what should selectively be torn off often cannot be established. The reason for this is that there is no commonly accepted definition of what is meant by "wet" insulation. A contractor, for example, may remove only what is damp to the touch. If the new roof fails shortly thereafter, is the contractor wrong? Not necessarily. He or she may be using a different standard of "wetness."

Obviously, completely saturated materials must go. But what about that which is merely damp to touch, or that which feels dry but moisture readings indicate to be damp? How do you determine where damp insulation stops and dry insulation begins? Part of the confusion results because different insulation materials have different tolerances to moisture, and different membrane systems also have different tolerances to moisture content. What may be "wet" in one situation may not be a problem in another.

## Problems Associated with Adding Layers of Insulation

Simply adding insulation layers on top of the existing roof can cause other problems. Most manufacturers require a minimum six-inch vertical flashing leg to warranty the roof. When the roof elevation is raised, reglets may become too low above the finished roof height to provide this minimum vertical flashing. As a result, a wall may have to be taken apart and new through-wall flashing installed above the higher roof flashing. If this is not done, water from within the wall will run down behind the roof flashing into the new roof. Mechanical unit curbs, drains, vents and other penetrations may have to be raised due to the change in elevation. Minimum flashing heights may not be attained if this is not done, resulting in a non-warranted roof -- and increasing the potential for water flowing over the tops of the flashings and causing leaks.

In addition, extra long fasteners will be needed to fasten the new insulation to the deck. These long fasteners are prone to bending and metal fatigue. If this happens, the fastener can break off and puncture the membrane; or, if enough fasteners break, allow the roof to blow off. To combat this problem, extra large diameter fasteners must be used -- but they cost a premium price.

Careful selection of roofing systems is important in general, and careful selection of a re-cover membrane and insulation is essential. Severe failures can result when the specified material for the new insulation or the re-cover membrane are chemically incompatible with the existing materials on the roof. Also, the weight of the new materials to be added must be carefully calculated. An engineering study that includes all code mandated snow and live loads must also be completed to assure that the added weight of the new roof does not

overload the structural capability of the building.

### **Severe failures can result when specified materials for re-cover membrane & insulation are chemically incompatible**

The problem of determining where to stop ripping is complicated further because the various types of moisture detection equipment do not work equally well on all types of roofing. For instance, no detection system works well on a Protected Roof Membrane Assembly (PRMA) roof or lightweight insulating concrete. Capacitance meters have little or no value in evaluating ethylene propylene diene monomer (EPDM) membranes or extruded polystyrene and sprayed-on urethane foam insulations. Nuclear meters do not respond on either of those, or with foamed glass. They also will give anomalous readings near walls, parapets or thick membranes. Infrared scanners will give false or misleading readings over extruded polystyrene, all concrete, and foamed glass insulations. Infrared scanners cannot be used on ballasted systems (unless the rock is removed) and may give anomalous results in areas that have been shaded from the sun all day. So, even if the roof is tested to evaluate insulation conditions, there are no guarantees of accuracy.

If a partial tear-off is done, you must consider also that, unless the insulation height of the existing roof is matched exactly by the new insulation, the difference in elevation may cause ponding (standing water) in low areas or near high spots where the higher areas interfere with drainage. In addition to causing premature breakdown of most membranes, standing water -- at best -- encourages leaks even at minor flaws. At worst, the extra weight of the pond can overload the structural system and cause a roof collapse.

### **Is Your Roof Insurable?**

Finally, your re-cover roof may not be insurable. If your insurer requires a Underwriters Laboratories (UL) listed or Factory Mutual (FM) rated roof, the re-cover may not qualify. FM and UL ratings are based on roof assemblies, and, in order to qualify for the listing, the roof must contain only the materials listed. There are no listings for re-cover assemblies. Code violations may also occur, as some of the model building codes require rated roofs in fire districts.

The question becomes, then: When is it safe to re-cover a roof at all? If the issue is not carefully thought out and all of the ramifications are not fully considered, the situation can be deadly. Ask yourself these questions: Is the roof generally in good condition? Have the leaks in the roof been localized and of short duration? Is the roof younger than its expected life span? Will the structural system support the extra load of the new roofing system? Has the condition of the insulation been tested and verified? Is this building located in a fire district that requires a rated roof? Is an FM or UL listing required? If you can't answer any of these with a "yes," or if you don't know for certain, consult a building diagnostics specialist. He or she can help you determine which way to go.

[Home](#) | [Newsletter](#)

*Karen Warseck, AIA. CSI, is president of Building Diagnostics® Associates, a*

*Hollywood, Fla., firm that specializes in the analysis of roofing and waterproofing problems.*

*This article was reprinted from the September 1987 issue of Building Operating Management Magazine. For other great articles, log on to Facilities Net at <http://www.facilitiesnet.com>.*

Copyright © 1997, 1998, 1999, 2000 by  
Building Diagnostics Associates.  
All rights reserved.

