hardening rate and poor strength, lime-based mortars are not used in standard U.S. construction anymore except for interior, nonload-bearing walls.

5.3 Roof Leaks

While some of these buildings have been well maintained over the years by their owners, most of them have not, especially their roofs. Water leakage through the roof membrane is a common maintenance problem. The most common point of leakage in the roof membrane is the parapet wall flashing where the roof decking abuts the parapet walls.

Often, the flashing along the parapet wall simply dries out and cracks due to ultraviolet light exposure, weathering, and age. Sometimes the membrane will have been broken or penetrated by foot traffic on the roof. Sometimes the flashing membrane simply pulls away from the wall due to a combination of age-related material shrinkage, and weather-deteriorated tar, mastic, or sealing compound. Whichever is the case, deficient flashing allows rainwater to enter the building next to a load-bearing wall. The rain water then runs down the interior side of the wall.

Because there is often a stud wall cavity between the interior side of the masonry wall and the interior finish of the building, the leakage can go unnoticed for years if the water simply "hugs" the interior side of the masonry wall. The water may not cause any noticeable staining of the interior walls or ceilings because the interior finish may not even get wet despite extensive leaking. Further, because many of the buildings now have been outfitted with drop ceilings, wall paneling, and fixtures that obscure the original interior finish, any stains on the original walls and ceilings that may have occurred may not be observable. Thus, if regular inspections of the roof are not done to check for roof membrane continuity, leakage can go undetected for years.

This is especially true with the, "if it ain't broke, don't fix it," mentality of some businesspersons. They often do not spend any time or money on preventive maintenance items. They often wait until an item actually fails or creates a crisis before doing anything. Even then, they may only do the most minimal of repairs to keep the immediate maintenance expenditures low. The practice is termed deferred maintenance.

5.4 Deferred Maintenance Business Strategy

For the short term, a deferred maintenance business strategy can be beneficial to the current owner. By deferring maintenance expenditures and selling the building before any major maintenance work must be done, the current

owner of the business can essentially transfer the costs of major maintenance to the future owner or perhaps an insurer.

For example, a building owner may know that the flashing of his roof is in poor condition and is likely leaking now, or will soon leak. The owner is well aware that such leakage can cause structural damage to the building over time. However, the owner may decide to do nothing about the problem because it is not causing any immediate unsightly staining of the building's interior, it is not damaging any stored inventory, and because the owner does not wish to spend money on preventive maintenance. The owner defers the maintenance and pockets the money that would have otherwise been spent.

If the roof flashing leaks as expected, and the leakage damages the material integrity of the wooden roof joists, the ability of the roof to carry the required dead and live loads diminishes. If the integrity of the wooden joists diminishes sufficiently, the roof may eventually collapse when the next heavy snowfall, heavy storm, or freezing rain occurs.

At that point, the owner of the building may be able to make a property loss claim on his insurance under the provisions for sudden collapse. Any inventory damaged in the collapse and any damages to the interior finish resulting from the collapse may also be covered by the insurance policy. Further, the loss of business activity that would have occurred if the business had not sustained the collapse may be claimed if the owner carried business interruption insurance.

If the owner is successful in collecting on these claims, he will have essentially transferred the major costs of maintenance of the roof to the insurance company. Further, the owner will have also transferred the inherent risks assumed by such a deferred maintenance strategy to the insurer. In essence, the structural collapse policy on the building becomes a major maintenance contract.

If the building owner is particularly astute, not particularly honest, and the building is located in an area where building code enforcement is poor, the owner may further profit from the above situation. Most insurance companies provide sufficient money, less any deductible, to properly repair the collapse damage. They will have estimates made by reputable contractors who are required to make repairs in accordance with good practice and applicable building codes. The insurer will then issue a check to the owner in an amount commensurate with the estimates so that the owner can have the work done by whichever reputable contractor he or she chooses.

However, if the building owner personally manages the repair work and the repairs are done "on the cheap" rather than as estimated, the owner can pocket the difference. When the owner then sells the building, he can claim that the building has a brand new roof and a remodeled interior despite the fact that perhaps neither was constructed according to code or good practice.

In the long term, the practice of deferred maintenance substantially increases maintenance costs severalfold. In a sense, deferred maintenance is like deferred loan payments. Not only do they accumulate into a harder-to-afford large sum that eventually has to be paid anyway, but they also generate interest. If a roof is promptly repaired, only the roof costs are expended. If a roof is not promptly repaired, money must still be spend on repairing the roof itself, and additionally on all the items that have become water damaged as a result of the roof work being deferred. Sometimes the resulting water damages severely reduce the structural integrity of the building, and therefore its usable life. This, of course, is another additional cost directly attributable to the deferred maintenance.

Unfortunately, in the short term, the practice of deferred maintenance can make economic sense to the owner when the costs and risks can be transferred to other parties. Thus, even though deferred maintenance increases the overall costs in the long run, if the current owner doesn't have to pay them and can find an unsuspecting "patsy" who will, the owner can save or even profit by employing the strategy.

5.5 Structural Damage Due to Roof Leaks

With respect to the type of building being discussed, water leakage through the roof causes two main types of structural damage:

- weakening of wooden roof and floor joists.
- weakening of the load-bearing walls.

Most people are familiar with the usual ways in which leaking water damages wood. It provides needed moisture for colonies of bacteria and fungi. The bacteria and fungi initially establish themselves on the surface of the damp areas, and then go on to digest the organic materials within the wood itself. The resulting wood rot, or rust, is often black, brown, or white in color.

Water leakage can also cause structural wood timbers to swell and soften. Structural-grade wood that has been properly kiln dried usually has a moisture content of 8–12%. Green wood, which is significantly weaker, less dense, and less stiff, can have a moisture content as high as 40%.

Wood is hygroscopic, which means it readily incorporates moisture into its cellular structure when such moisture is available. If structural timbers are carrying load when they absorb excess moisture, they can permanently deform in response to the loads. This is, of course, the basic woodworking method for shaping straight wood pieces into curves.