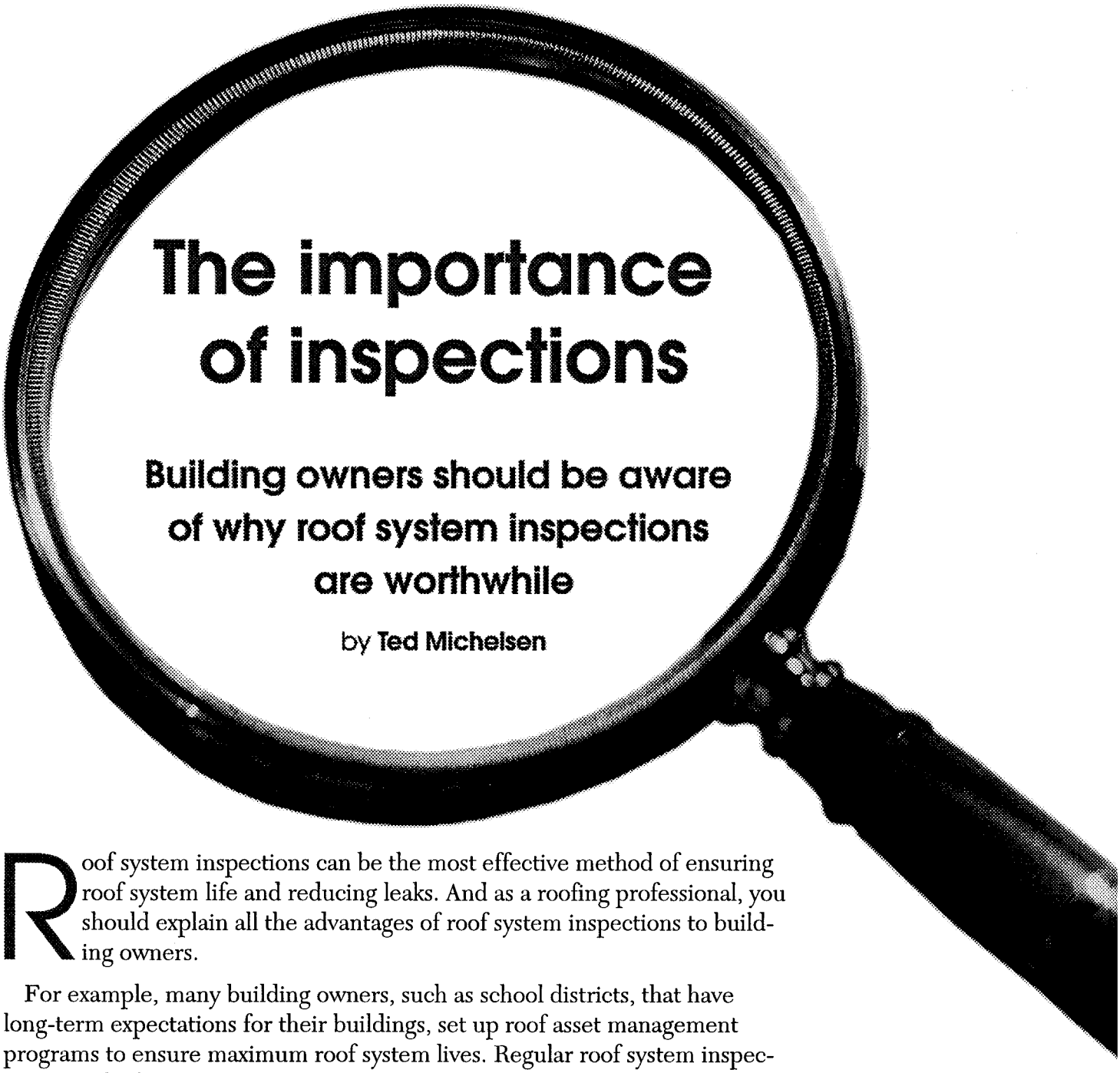

The importance of inspections

Building owners should be aware of why roof system inspections are worthwhile

by **Ted Michelsen**

Roof system inspections can be the most effective method of ensuring roof system life and reducing leaks. And as a roofing professional, you should explain all the advantages of roof system inspections to building owners.

For example, many building owners, such as school districts, that have long-term expectations for their buildings, set up roof asset management programs to ensure maximum roof system lives. Regular roof system inspections are the keys to these programs' success. But owners with shorter time perspectives, such as retailers and developers, may incorrectly assume that because they plan to occupy their buildings for limited times, they do not need to perform roof system inspections. Such owners may not understand what inspections are designed to do—help prevent leaks.

The following information can help building owners understand the value of roof system inspections, as well as reaffirm what should be done during such inspections. Building owners should understand that if a consultant conducts a roof system inspection, a contractor will need to be retained to perform repairs. However, if a contractor conducts a roof system inspection, he can perform repairs at the same time.

Common misconceptions

The first thing you need to do is understand the misconceptions building owners may have regarding roof system inspections. Too often, an owner only considers a leak's direct repair cost and overlooks unseen damage to his building and possible loss of business revenue, as well as possible lawsuits caused by people slipping on wet floors, for example. A leak's cost always is more than the cost of a roof system repair.

Owners also often believe roof system inspections are expensive and unnecessary. According to the Roofing Industry Educational Institute (RIEI), roof system inspections typically will cost about 1 cent to 2 cents per square foot of roof area. An initial inspection may be more expensive if an accurate roof system plan is generated that shows all rooftop equipment and penetrations, as well as any ponded water or repairs. If a roof system plan is made, an initial inspection typically will be 3 cents to 5 cents per square foot.

When to inspect

After deciding whether to conduct an inspection, the next thing an owner may consider is how often roof system inspections should be performed. The industry-recommended schedule is twice per year and after severe weather events. Generally, inspections should be conducted during the spring and fall because you can find problems and repair any damages before and immediately after severe weather occurs. Roof system inspections also can be conducted at other times as needed.

Severe weather includes any storm that has high winds, hail or other elements that could damage a roof system. An inspection after a severe storm does not need to be as thorough as a regular inspection. As an inspector, you should concentrate on a roof's perimeter attachments, all flashings, rooftop equipment that could have had parts blown off, and the roof's field for damage from blowing debris or hail.

Despite the benefits of roof system inspections, not every owner has the resources to inspect roof systems twice per year. In these cases, it is best to urge owners to develop plans that increase inspection frequency on older, problem-prone roof systems. This way, a new roof system only may be inspected once per year until problems are found, and older roof systems with problem histories might be inspected twice per year. For roof systems that are not inspected twice per year, I recommend owners have inspections completed before a harsh weather season, such as winter, because roof systems in good condition are more likely to survive harsh weather.

How to do it

It is best to begin an inspection on the ground—not on a roof. By walking around a building and observing its exterior condition, you can get clues as to where to look for rooftop problems. For example, water stains (efflorescence) on masonry walls indicate water is getting into the walls—possibly from a roof leak in that area. Also, look for obvious signs of building movement, such as cracked walls, out-of-alignment walls or damaged roof edges. By noting these problems and their locations, you can concentrate efforts in those areas when inspecting the roof system.

An inspection of a building's interior also is necessary. While conducting an interior inspection, talk to maintenance personnel about previous and current leak locations. Note locations of stained ceiling tiles and walls, and ask building occupants whether the stains are remnants from repaired leaks. Also, try to take a good look at the underside of the roof deck to determine its type and condition. If a roof deck looks badly damaged, you should not walk on the roof until it is determined the deck is safe. Damaged roof deck areas also indicate a roof system possibly in need of repair.

In addition, knowing the type of roof deck and interior leak locations can help you determine areas where leaks likely are located. For example, water runs downhill in the flutes of a sloped steel deck until it reaches either a lap in the deck panel or another hole in the deck. Therefore, a leak should be up slope no more than the steel deck panel length. Concrete decks, which are monolithic, allow water into buildings at cracks and penetrations, so a leak could be any place up slope.

Once you have determined the locations of all exterior and interior problems, you are ready to go on the roof. You should take a clipboard and paper; copy of the roof plan (if it exists); probing tool (a 4-inch [109-mm], round-point mason trowel works well); screwdrivers with straight and Phillips tips; marking device compatible with the roof membrane type; and camera. Typical marking devices include spray paint for bitumen-based roof systems and lumber crayons or permanent markers for many single plies. It often is convenient to have a trash bag, as well, to pick up light debris from the rooftop during an inspection. Because it is unsafe to climb a ladder with your hands full, put the materials you will need in a backpack.

Once on the roof, try to get an overall impression of the system, such as the surface's appearance and whether the roof system has been maintained. Also note staining from dried ponded areas.

A successful inspection requires you to fully and carefully inspect flashings and penetrations, any rooftop equipment and the roof's field. Flashings and penetrations are the most critical because a vast majority of leaks and problems occur there.

RIEI recommends you start an inspection in a roof's corner and inspect all perimeter flashings until you return to your starting point. Then, walk the roof's field in a pattern of rows about 5 feet (1.5 m) to 10 feet (3 m) apart. The row spacing will depend on roof system type. For example, it is difficult to see anything but surfacing on a ballasted or gravel-surfaced roof system, so such systems should be inspected

every 10 feet (3 m), but a smooth-surfaced or exposed roof system should be inspected every 5 feet (1.5 m).

When walking a roof's field, make sure to stop at all penetrations and rooftop equipment. Note that roof systems often are divided into sections that can facilitate inspections. Any naturally occurring obstacle, such as different levels, expansion joints, area dividers, etc., typically divide a roof into sections. Some building owners already may have asset management programs that divide roof systems into sections. If no such plan exists, it is up to an inspector to divide a roof system.

A brief checklist

While conducting an inspection, there are some additional items to be checked. Taking photographs will help you remember what you inspected and why. When taking photographs, note what they depict—unmarked photographs can be difficult to interpret later.

All previous repairs always should be checked to ensure they are intact and not leaking. In addition, any metal membrane interfaces should be checked, and roof drains should be examined to make sure they are not clogged and their clamping ring nuts and bolts are tight.

If flashings are a gravel-stop detail, check for splits in the base flashing at the joints of the gravel-stop metal and for tears and/or disbonding at the metal flashing interface. Additionally, note gravel-stop metal's overall condition.

With flashings and details, take extra effort to identify any defects that occur in the areas potentially identified as problem areas during the external building inspection—these defects could be the problems' causes or results.

When inspecting rooftop equipment, open or loose doors or panels should be closed and secured and all seals and expansion joints examined for splits, cracks or leakage. If leaks have been reported under an equipment unit and there are no obvious problems with the unit or flashings (after a water test), arrangements should be made to have a heating, ventilating and air-conditioning contractor examine the unit for problems, such as leaking plumbing and condensation.

When inspecting a roof's field, walk slowly and look side to side to observe any obvious problems with the membrane. Examples of problems to look for include missing ballast or gravel, surfacing or membrane deterioration, and obvious punctures. Spend extra time examining areas where leaks are suspected.

Follow-up

After an inspection, provide an owner with a report of your findings—many owners will not pay for inspections until they receive reports. The report should include the problems found and their locations, recommended corrective actions and repairs, and a cost estimate for repairs. Photographs will help an owner understand a problem's severity but are not necessary.

RIEI has developed a general inspection checklist for all common roof system types to help ensure you have inspected important items. In addition, NRCA offers sample field sheets for built-up, single-ply and spray polyurethane foam roof systems. For more information, contact RIEI at (303) 703-9870 or access www.riei.org or contact NRCA's InfoExpress at (800) 323-9545 or (847) 299-9070 or access www.nrca.net.

A worthwhile task

To ensure roof systems perform as long as possible, building owners should understand that roof system inspections are not difficult or necessarily time-consuming. Finding a problem before a leak occurs is better and more cost-effective than repairing a leak and addressing leak-related problems.

Ted Michelsen is director of the Roofing Industry Educational Institute.