

D. C. TAYLOR CO.

A Countdown of the 10 Most Common Roofing Problems

After more than 60 years in the roofing business, the crews, project managers, and supervisors at D. C. Taylor Co. have seen everything from the rarest and most unusual roofing problems to the highly typical and expected ones. This paper addresses the latter including causes, risks, prevention, and remediation in the hopes that you can avoid these problems altogether through early detection and regular maintenance.



No. 10 Shrinkage

Shrinkage is most common on EPDM or modified bitumen roofs. Its causes include aging of the material, poor installation, and UV exposure. A few decades ago, unreinforced rubber roof systems were plagued by shrinkage problems, but thanks to technological advancements and improvements to EPDM roofs, the problems have diminished.

The primary concern with a roof that is shrinking is the way it pulls the flashings at curbs, penetrations, and walls; this often leads to splits and cracks that allow moisture in, which can result in leaks.

PREVENT IT Proper installation is the best prevention. With modified bitumen, crews should lay out the material to relax for 45 minutes, then when installed, alternate/stagger end laps. On an EPDM roof, use of ballast or a coating can prevent UV from heating the membrane and causing shrinkage.

REPAIR IT Replace affected flashing and curbs and relieve pressure and pulling by cutting the flashing, securing the field sheet with a termination bar or russ strip, and installing a new flashing.

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No. 9 Alligatoring

Alligatoring of the roof membrane is most common on modified bitumen and built-up roofs. This surface condition is caused by small splits that form with over exposure to heat and UV. If the oil leaches from the petroleum-based roof system, it is less flexible resulting in surface damage that looks similar to an alligator's skin.

If not caught early, alligatoring could result in premature failure (i.e. early replacement) of the roofing system. Large leaks can occur and it will be difficult to stay ahead of them.

PREVENT IT Regular inspections will result in early detection. Application of a UV protectant or reflective roof coating will prevent damage.

REPAIR IT Investigating the cause of these splits will determine the best remedy; however, small areas can be removed and patched. If the problem is substantial, replacement is necessary.



No. 8 Unwanted Vegetation and Environmental Debris

Sprouting plants and a collection of leaves and dirt can happen anywhere on any roof system, but it's most typical on ballasted systems because the ballast (i.e. rock) can trap dirt, giving weeds the opportunity to grow. Unwanted vegetation and environmental debris are

caused by a lack of maintenance. Leaves, pine needles, and pollen typically gather at the roof's edge and drain. Regular cleaning can eliminate the problem.

The biggest worry when there is unwanted vegetation on the roof is that it will clog the drain. But other, equally concerning problems can result too. A collection of dirt on the roof provides the opportunity for microorganisms to grow. Dirt can be deposited on the roof and once it rains, you've got a petri dish. Squirrels and birds can exacerbate the problem by depositing more debris in the dirt. If unattended, the problem can literally take root.

Growth of algae is common when there is excess moisture on the roof; it creates a safety hazard by making the surface slippery for rooftop workers.

PREVENT IT The best way to prevent the accumulation of unwanted vegetation and environmental debris is to keep trees trimmed and clean the roof annually or twice per year.

REPAIR IT If the problem exists, it's best to hire a professional to come clean the roof. They have the equipment and training necessary to work safely near the roof's edge and can identify if the debris has caused any damage to the functionality of the waterproofing membrane.



No. 7 Clogged Drains, Scuppers, Gutters & Downspouts

When drainage paths become clogged, problems ensue. The cause of clogged drains, scuppers, gutters, and downspouts is typically carelessness and lack of maintenance. Whether the obstruction is from facility debris (e.g. manufacturing residue, cardboard, rags from HVAC repair technicians, soda bottles left behind) or the environment (e.g. leaves, pine needles, dirt, pollen), it's important that you remove it from the roof.

Obstructed drainage increases the weight load on the roof, accelerates the deterioration of the membrane, can cause leaks, and promotes the growth of plants and microorganisms.

PREVENT IT To keep drainage paths open, be proactive. Trim nearby trees to eliminate the risk of leaves and pine needles clogging drains and scuppers. Quarterly or biannually perform general preventive maintenance that inspects and cleans drains

and waterways. Use a checklist and require that rooftop workers remove all debris (e.g. spare parts) from the roof during each visit. Check the roof after every major storm or any storm where strong winds may have blown debris onto the roof.

REPAIR IT If drains are clogged, it's important to clear the drain as soon as possible. An especially bad clog may require that a plumber be called to snake the drain. If problems persist, consider installing larger drains, gutters, or downspouts.



No. 6 Pitch Pockets

Problems with pitch pockets, a type of roof flashing used to seal penetrations, prevail on all types of roofs but are most typical on built-up or modified bitumen roofing systems. Manufacturing facilities, due to the large number of rooftop penetrations, are plagued by pitch pocket problems.

There are many reasons a pitch pocket fails. The sealer can dry out and shrink. Structural movement may also be to blame. If the penetration that is wrapped by the pitch pocket moves or vibrates, the pitch pocket seal could be compromised.

Premature failure may be due to improper installation (e.g. incompatible materials) or lack of maintenance. Regardless of the reason, all pitch pocket problems mean leaks.

PREVENT IT Routine inspections and basic maintenance (e.g. refilling the sealer) are the best course of action to keep pitch pockets in working order. If your roof has a high volume of penetrations, have it inspected every three to four months.

REPAIR IT If pitch pocket metal is completely corroded, contractors will remove the existing pitch pocket, put in new metal, and clean the old solution. Lastly, they'll mix a two-part epoxy and install the new pitch pocket.



No. 5 Improper Repairs

When a problem is repaired improperly, what was already a bad situation becomes worse. Improper repairs are the result of an inadequate understanding of the problem, an inexperienced technician (someone without proper training who isn't an approved roof system applicator), and/or incompatible materials.

Improper repairs can lead to rust, ponding water, or leaks. They are costly too; usually undoing the faulty repair takes longer, increasing labor. The manufacturer of the roof system dictates the proper materials and application methods and if they're not followed, the manufacturer can void the warranty.

PREVENT/REPAIR IT Work with a licensed contractor that has been approved by the manufacturer of the roof system installed on your facility. The manufacturer can provide recommendations if you need a referral. And once you contract for the work, don't be afraid to ask. A qualified contractor won't mind taking a few minutes to explain what repair he intends to make, the training he's had, and the materials he'll be using.



No. 4 Flashing

Problems with flashing can happen on any type of roof at any facility. Poor or improper installation is a likely culprit. Sheet metal fabrication requires special tools or equipment. Because of this, short cuts are often taken.

Lack of adhesion can be caused by the introduction of moisture behind the flashing that created a blister, or moisture infiltration through the wall, that forces the flashing membrane off the wall. If incompatible materials are used, problems with adhesion are also possible. Building movement because of thermal activity may cause shrinking and flashing membrane to pull away as well.

D. C. Taylor Co. estimates that more than 70 percent of roof leaks are a result of flashing problems. Failed flashing increases the risk for high-volume water leaks.

PREVENT IT Make sure you hire a licensed roofing contractor that will follow manufacturer recommendations regarding the installation of flashing (e.g. install flashing at a 6- to 8-inch height minimum).

REPAIR IT The typical repair method is to remove damaged or faulty flashing and replace it. Situational decision-making is necessary to find the best repair method.



No. 3 Ponding Water

No one roofing system or type of facility is more susceptible than another; ponding water is a universal problem. The primary source of ponding water is lack of roof slope in the system. The absence of roof slope isn't the only poor design decision that results in drainage problems; others include:

- A scupper or drainage system that has no crickets or saddles.
- A curb that obstructs the drainage path.
- An inadequate drain sump.
- Clogged drains and gutters.

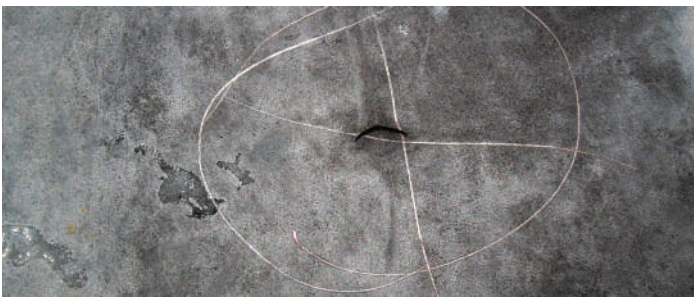
If there's been a leak that caused the deck to corrode or insulation to compress, the deck or insulation might sag enabling water to collect. Another source of this deflection is the weight of rooftop equipment.



Water that doesn't drain from the roof properly provides an opportunity for microbial growth. It also accelerates deterioration. Manufacturer requirements state that water should not stand on the roof for more than 48 hours because it reacts with the membrane and causes premature aging. It also creates slip and fall hazards, adds weight to the roof that structural members and the roof deck may not have been designed to hold, and attracts environmental debris (e.g. sprouting seeds). Additionally, severe leaks are probable.

PREVENT IT Inspect your roof. Perform visual inspections after storms to ensure drainage has not been obstructed with environmental debris. Call in a licensed roofing contractor for regular annual inspections and schedule routine maintenance. Regular cleaning and repairs will identify potential problems early and ensure proper drainage.

REPAIR IT Improve the roof's design. Strategies include pouring tapered lightweight concrete, adding tapered insulation, or installing additional drainage mechanisms (e.g. crickets).



No. 2 Punctures

Punctures are most worrisome on single-ply roofing membranes. Contractor damage is the most common cause. Sharp tools dropped on the surface, holes or cuts from removing HVAC panels, or screws and nails being dropped and walked on are just a few examples of the possible destruction that results from carelessness.

Punctures, scrapes, and tears that are left unnoticed result in wet roof membrane and insulation, leaks and, potentially over time, a rusted or rotten structural deck.

PREVENT IT Work to change behaviors. Place signage at access points and hold workers accountable. Consider using a log sheet to track contractors working on the roof. If roof damage occurs, you may be able to invoice the responsible party for the repair. While workers are signing in to access the roof, have them read a document that gives them direction on roof protection. If walkway pad is in place, insist that all contractors use it. Your roofing contractor can also provide temporary protection to prevent damage and inspect roof areas after modifications or trade work is complete.

REPAIR IT Early detection is key. Caught early enough, the repair won't be intrusive. Typically the membrane around the puncture is cleaned, primed, and patched.



No. 1 Roof Leaks

Roof leaks are the result of many of the problems previously discussed. They are the most common issue reported by facilities professionals. They most frequently occur on roofs with heavy foot traffic and a large number of penetrations. Leaks are caused by lack of maintenance, damage by other trades, weather, poor installation/workmanship, or roof materials that have exceeded their service life.

Moisture intrusion can cause lost product/profit, reduce employee morale, result in poor customer satisfaction, and increase liability due to the likelihood of slips and falls. They also reduce the thermal performance of insulation, reduce the roof system's useful life, and cause structural damage.

PREVENT IT The best means of preventing leaks is regular roof maintenance. General preventive maintenance usually includes cleaning drains, replacing sealants and making repairs at the earliest onset. Pre- and post-inspections for work on the roof by technicians is also beneficial in making sure no damage was sustained.

REPAIR IT A leak evaluation is necessary to determine and evaluate the cause of water leakage. Only after the source of the problem is identified can an effective repair solution be applied.

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