TCE & Associates, Inc. Consulting Structural Engineers
Preserving Your Past, Building Your Future®

ROOF REPAIR OR ROOF REPLACEMENT?

Roof damage is one of the few building envelope problems that is typically quickly addressed due to the nuisance of roof leaks to building occupants. However, many building owners and property managers simply repair roof leaks as they occur, which can be very costly, especially as the roof ages and more frequent repairs are needed. At some point, it no longer makes sense to incur the costs and nuisance associated with spot repairs and roof replacement is required. For many roofs, the new roof system will also provide yearly energy savings by upgrading the roof's insulation and providing a reflective membrane to reduce heat absorption.

Photo 1 – Roof repairs performed at seam failures. Seams are a typical location of roof failures.

Photo 2 – Roof repairs performed at seam failures

ROOF REPLACEMENT

There are two general types of roof classifications: steep-slope and low-slope**:**

1. Steep-slope roofs use water-shedding roof coverings, intended to shed water from upslope courses down over neighboring lower courses to protect the structure from water entry. For example, wood or asphalt shingles

2. Low-slope roof systems generally use roof membranes, which are intended to serve as water impermeable coverings that are designed to protect the structure from water entry.

The focus of this newsletter shall be replacement of low-slope systems. The world's best roofing membranes would be seamless, self-healing, easily patched if damaged, and be made out of a material that never deteriorates. So far we have not found such a material. However, we lean towards materials which have as many of the "ideal" properties as possible.

Water is by nature a universal solvent. Ponded water is therefore a potential problem for any material, although there are some materials that are less affected than others. One principle is to drain water away or off roofing materials as fast as possible to make the material last and decrease the likelihood of leaks. Roofs work better with slope to drain water off or to drains. If there is no opportunity to provide slope or much slope, then choose a material that is either not affected or less affected by ponded water.

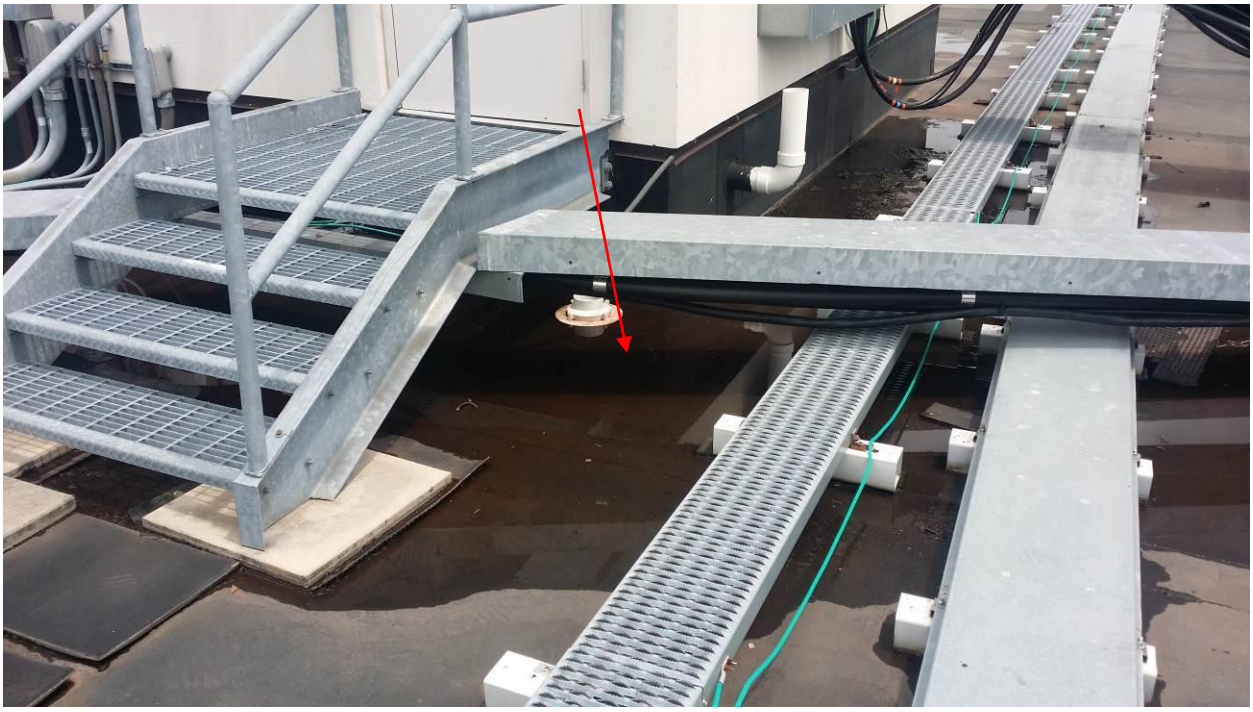

Photo 3 – Ponding water at roof

Building owners, architects and engineers are bombarded with new roofing materials from numerous manufacturers. They sell promises of better performance and quality. Some sell the perfect roofing system for all buildings. But a knowledgeable building owner and roofing consultant knows there is no panacea or universal roof system that will protect all buildings. Roof membrane selection is based on performance and not on promises. Each roofing material has its own performance properties and some are not conducive to all building conditions. Roof membranes to be considered must have a proven track record. They must be thoroughly tested and successfully performed on a roof project comparable to that of the proposed roof project.

It is imperative that the owner follow a systematic approach to the roof membrane selection process. First of all, a roof system is an assembly of building components that make up the entire roof system. These components include not only the roof membrane but the materials supporting the membrane including insulation, and structural deck. They all interact with each other. Physical connections like flashing requirements also must be considered. Other factors contributing to the selection process are environmental conditions, maintenance, building codes, aesthetics and budgetary constraints. All these factors play a role in roof membrane selection process.

Towards selecting a membrane system, we recommend the following desirable features:

- A fully adhered membrane has the advantage of eliminating the potential for water migration between the membrane and substrate which makes it much easier to locate leaks. This advantage often has the ability to "self heal" and to be easily repaired.

- A fully protected membrane commonly referred to as a PRMA (Protective Roof Membrane Assembly) provides greater longevity to the membrane performance through reduced thermal change and greater protection from on-going maintenance work and foot traffic. This system is also referred to as an IRMA (Inverted Roof Membrane Assembly).

- A thick membrane affords more protection against normal exposure deterioration, construction and future repair operations. A thick membrane is also more resistant to ponding water, harmful liquids and chemicals.

- A monolithic applied membrane without seams or laps is ideal. However sheet membrane seams, once torch-welded or heat-welded are acceptable. Seams joined with adhesive or solvents are not recommended.

- A membrane material which is least affected by standing water. For instance, asphalt dissolves under water. Coal tar and PVC materials do not.

Once a choice is made, the next decision is to which manufacturers are acceptable. Research must be done to find out who manufacturers the roofing materials. Some manufacturers purchase someone else's product and market and label it as their own. Next it is important to find out if any changes have been made to the product since the product's arrival in the roofing market. Ask about their approved applicator program. A good manufacturer provides a quality installation program for contractors who want to be certified. Your roof should not be an experiment.

Photo 4 – Heat welding seams in new roof

Photo 5 – Completed roof installation

Maintenance and upkeep is vital for continued service and longevity of the roofing membrane. Building owners should have roof membranes examined periodically by a roofing consultant. The condition survey will assess the condition of the roof membrane, make recommendations for repair & maintenance, and help owners prepare budgets accordingly.

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