Technical Advisory
Roof System Functionality – 25-2025

TITLE: Roof System Functionality

DESIGNATION: TA-25-2025

OBJECTIVE: This TA attempts to provide guidelines on how to assess if an existing roofing system has been damaged due to external and/or extraordinary events. It also attempts to answer the question "What constitutes roof system damage?"

BACKGROUND

The topic of whether a roofing system has been damaged or not has been debated for many decades. Natural events, physical abuse, chemical attack, and many other factors can damage an existing roofing system. This TA attempts to provide guidelines on how to assess if an existing roofing system has been damaged due to external and/or extraordinary events.

It should be noted that this TA does not address the following:

- Expected weathering or deterioration.
- Aesthetic issues resulting from external factors unless they can be assessed through quantifiable tests and agreed-upon criteria.
- Deficiencies that arise out of improper or poor design, defective materials, improper installation, and deferred maintenance.

Determining and opining on whether an existing roofing system has been damaged due to unusual weather events, fire, unanticipated exposure to chemicals or discharges, or physical damage is an important part of many insurance claims, warranty claims, or other legal issues. Therefore, it is essential for IIBEC to provide guidelines for professionals as to what constitutes damage to an existing roofing system where such assessments necessitate professional knowledge, experience, and judgment.

It should also be noted that the definition of damage contained in roofing specifications, insurance policies, or roofing system warranties may be different than what is indicated in this TA. However, in the absence of an agreed-upon definition of damage in such legal documents, professionals can use the guidelines in this TA as a basis for evaluating if such damage has occurred.

DISCLAIMER

WHAT CAUSES DAMAGE

In addition to natural and expected weathering or deterioration, damage to a roofing system can be caused by many external factors, such as:

- Extraordinary weather or natural events, such as hail, wind, rainstorms, etc.
- Chemical spills or chemical exposure
- Physical damage caused by external factors, such as punctures caused by impact from tools, items placed on the roof, flying debris, etc.
- Physical damage imparted during material installation
- Fire or excessive heat
- Discharge or exhaust from rooftop equipment
- Change in use or modified environmental conditions of underlying areas

In this TA, the above items are collectively referred to as "external factors."

WHAT CONSTITUTES DAMAGE

For an existing roofing system to be rendered as damaged, one or more of the following must be demonstrated through proper analysis and evaluation:

- Appearance: The roofing system's appearance has been diminished beyond its originally intended appearance based on previously agreed-upon and measurable criteria. Such assessment must consider natural weathering and deterioration. As previously indicated, this TA does not address appearance issues that cannot be scientifically and reliably quantified. Many appearance issues are highly subjective. However, in some instances, aesthetic issues can be quantified through recognized testing procedures and compared to previously agreed-upon criteria. For example, it is possible to define an allowable range of color fading of roof coatings and quantify such fading using color spectrometers. It may also be possible to quantify size and frequency of indentations caused by exposure to hail. However, in all such cases, opinions related to damage can only be properly rendered if a previously agreed-upon criteria has been established for comparison.

- Functionality: In a typical application, a roofing system is intended to provide weather protection, and in many cases also thermal protection over a space. A roofing system can be considered damaged due to external factors if one or more of its functional attributes as a roof have been diminished, regardless of whether there is a noticeable impact on performance or not.
  Examples of damage with immediate adverse impact on function are as follows:
  - Breaches in the roofing system that result in water leakage into the interior building space or within the roofing system.
  - Breaches in roofing accessories that result in moisture intrusion into the roofing system, interior building space, or other building components.
  - Diminishment of thermal protection of the roofing system.

  Examples of damage without obvious immediate adverse impact on performance are as follows:

  - Diminished thermal performance due to insulation saturation.
  - Diminished wind uplift resistance due to partial damage to wind resisting components of the roofing system.
  - Diminished life expectancy (see below).

- Life Expectancy: A roofing system can be considered damaged if its life expectancy, reliability, and/or durability have been diminished due to external factors. Although an accurate estimation of reliability, durability, and life expectancy is typically not practical, proper investigation and assessment can provide

sufficient information to a qualified professional to opine on whether or not the life expectancy, reliability, and/or durability of a roofing system has been diminished. Examples, although not fully inclusive, of scenarios when life expectancy and durability may have been adversely affected include:

- Surface coating on the roofing system has been damaged such that it can allow premature degradation or corrosion of the substrate components over time.
- Granules or gravel surfacing have been eroded or displaced such that accelerated weathering of the underlying materials can occur.
- Damage has occurred on a localized and limited basis, but such damage is not repaired. In such cases, the reliability of the roofing system can be diminished.
- Reinforcement in a roof membrane has been damaged, but the top protective surfacing remains intact.
- The top protective surfacing over the reinforcement has been eroded or damaged through abrasion or chemical exposure, but still provides immediate protection of the reinforcement.

ASSESSMENT OF DAMAGE

A detailed discussion on how to assess each type of damage is beyond the scope of this TA. There are many tools and evaluation methodologies available to professionals who are tasked to evaluate if damage has occurred to a roofing system. Before opining on such matters, the professional should consider the following:

1. Has the roofing system been subjected to external factors that were beyond that anticipated by the design, installation, and manufacturing characteristics of the roofing system and its components? In some cases, the professional may be tasked with determining if such external factors fall within various definitions indicated in warranty provisions or insurance coverage. Evaluating if external factors fall beyond the anticipated normal exposure may involve researching historic weather data or assessing the presence of physical damage that can be correlated with such external factors.
2. Has the function and reliability of the roofing system been compromised? Various aspects of roofing system functionality and condition can be evaluated through many recognized methods. Below are some examples of each method:
    a. Water Testing: When performed properly, water testing can help confirm watertightness of a roofing system or assist in locating the source of a leak.
    b. Wind Uplift Testing: There are several recognized test methods that are intended to evaluate the wind uplift resistance of a roofing system. These tests can be used as tools to assess wind uplift characteristics of a roofing system for comparison purposes and to complement other observations or test data.
    c. Microscopic Examination: Microscopic examinations of roof components can be helpful in assessing damage that cannot be readily observed with unassisted vision. For instance, microscopic examinations can be used to evaluate if surface scratches in a metal coating have extended down far enough to render the coating protection ineffective. Microscopic examinations can also help evaluate damage to a membrane reinforcement.
    d. Infrared Thermography: Infrared thermography has been used for several decades to identify roof insulation that contains moisture levels higher than its equilibrium moisture content or air leakage through roofs.
    e. Moisture surveys: Many moisture survey techniques, such as nuclear or capacitance methods, can be used to assess the extent of moisture located within a roof system.
    f. Electronic Leak Detection (ELD): When performed properly, ELD can be utilized to locate breaches in roofing and waterproofing membranes.
    g. Visual Review: In most cases, a thorough visual review by a qualified professional can provide invaluable information regarding nature, extent, and location of damage to a roofing system. Such information can complement other test methods and historic exposure data.
    h. Core Cuts/Test Cuts/Exploratory Openings: Core cuts, test cuts, or exploratory openings are often used to assess the condition of underlying components of a roofing system. Core cuts provide an opportunity to dissect a roofing system and examine each underlying component.

Typically, if a professional concludes that the roofing system has been damaged due to external factors, they may be tasked with opining if localized repairs can remedy the damage or if complete replacement/recover or application of remedial coating of the roofing system is warranted. In determining which remedial approach is justified, the professional should consider which of the approaches can most closely return the roofing system to a state in which it existed prior to the damage. Determination of damage does not necessarily warrant an opinion that full replacement or recover is justified. In most cases, an analysis of various remediation approaches may be required to determine which remedial approach is warranted.