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NEWS FROM: *The Region's One-stop Professional Claims Support Engineers*

HAIL DAMAGE TO ASPHALT SHINGLE ROOFS

Damage from hail approaches \$1 billion in the US each year. Much of the damage inflicted by hail is to crops. Even relatively small hail can shred plants. According to the NOAA National Severe Weather Laboratory, vehicles, roofs, air conditioners, fences, and landscaping are most commonly damaged by hail.

In order for one to properly investigate hail damage on a roof, a clear understanding of shingle systems must be known.

Roof shingles are manufactured in a variety of sizes, shapes and patterns. Composition shingles are comprised of three materials:

1. Reinforcement: Base mat material which is either glass fiber (inorganic) or paper (organic).
2. Binder: The binder consists of an asphalt mixture comprised of various sands and fines. The asphalt mixture provides weight and durability to the shingle. Its function is to repel water.
3. Granules: Shingles are manufactured in various colors by fusing a ceramic coating onto the crushed rock for color. Granules not only provide cosmetic appearance, but also provide UV/heat protection, weight, and a wearing surface which protects the asphalt.

During the manufacturing process, these granules are embedded into the asphalt coating while the coating is still hot. This layer of granules is referred to as the appliqué layer. Granules comprise about 1/3 of the shingle weight. An average residential roof (25 squares) has 1 ton of granules. Manufacturers take into account that granule loss occurs from the moment that the shingles are manufactured, shipped, and installed. Therefore, during the manufacturing process more granules are placed on the shingles than are needed to cover the mat. Some of the excess granules are not firmly embedded, but instead are loosely held in place on the roofing sheet. Some of the excess granules are often found in the gutters, at the bottom of downspouts, or on the ground after a rain storm. Granule loss occurs throughout the lifetime of the shingle during normal rainstorms and foot traffic. Loss of these excess granules which usually account for approximately 20% to 25% of the total granules on a shingle is common and does not reduce the weatherproofing life of the shingle. Granule loss only becomes a concern for shingle water tight integrity and performance when bare spots of coating asphalt are exposed on the surface of the shingles. Bare spots will weather and begin to degrade with solar exposure over time. Degradation of the reinforcement mat can then result in interior damages if accompanied with failure of the underlayment and flashings.

The life expectancy of a shingle roof depends upon many factors including, but not limited to, quality of reinforcement, color of the granules, roof pitch, the amount of UV exposure, and adequacy of the attic ventilation. As shingles age, they may exhibit blistering, flaking, cupping, clawing, splitting, cracking, and general granule loss.

During hail/wind storm events shingled roofs can indeed be damaged. The damage can be influenced by factors such as the age and preexisting conditions of the shingles. Also, it is common for shingle damage/conditions to be falsely attributed to hail impact or wind forces. The following conditions are often mistaken for wind or hail damage.

- Blistering: Small bubbles which may develop in to open pits.
- Flaking: Separation of shingle material.
- Cupping: Upward curling caused by shingle shrinkage.
- Clawing: Downward curling caused by shingle shrinkage.
- Splitting: Stress cracks and tears caused by thermal effects and solar radiation.

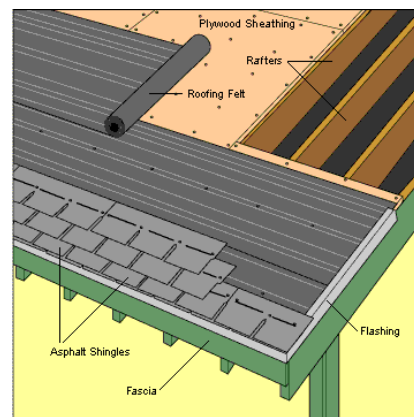
MANUFACTURING DEFECTS:

Hail/wind damage to roof shingle systems can also be confused with shingle defects or these defects can contribute to hail/wind damage. The following is a list of common shingle manufacturing problems.

- Variations in bundles: These are noticeable because the affected shingles are arranged in diagonal or straight up columns.
- Granule adhesion defects: These are observed as spot defects which are isolated.
- Anomalies: These appear sometimes as splits of the shingle.

SHINGLE INSTALLATION:

Drip edges of corrosion-resistant metal protect the roof edge. Roofing construction guidelines indicate shingles should overhang the drip edge. The tape over the self-sealing adhesives should be removed allowing for the shingles to self-seal. To assure proper maximum wind



performance, shingles must be installed on to a properly installed deck. Lack of proper attic ventilation and/or improper roof deck installation will likely cause thermal stresses and accelerated aging of the shingles.

When nails are used as fasteners, nails should have a minimum nominal shank diameter of 12 gauge (0.105") and a minimum head diameter of 3/8", be corrosion resistant, and penetrate 3/4" into the roof deck. Where the deck is less than 3/4" thick, the nail should be long enough to penetrate fully and extend at least 1/8" through the roof deck.

Having an understanding of shingle design and proper installation of shingles is extremely important in conducting a hail/wind roof damage claim. An investigation by your local I-ENG-A member can help determine the origin and cause of damaged shingles.