Resisting hail with SPF roofing

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By Mason Knowles

In the words of renowned expert **Richard Fricklas**, former director of the Roofing Industry's Educational Institute (RIEI), "There seems to be a mindset among some roofing contractors, as well as building owners and designers, that foam roofs are not suitable for hail regions at all." According to Fricklas, however, the material has an excellent story to tell when it comes to wind and hail resistance.

The National Roofing Foundation's (NRFs) report on sprayed polyurethane foam (SPF) roofing systems by **Rene Dupuis** shows sprayfoam's potential in hail-prone locales.

"With the continued trends toward 'sustainable construction,' it is within the best interests of the roofing industry to repair rather than replace whenever possible," said Dupuis. His research indicated the damage caused by wind-driven missiles typically does not cause the roof to leak unless the penetration extends through the foam, meaning unlike other roofing systems, SPF roofs may only need repairing when others require replacement.

Damage to SPF roofs

Hailstorms are frequently accompanied by high winds, which can create airborne debris that can damage the coating and SPF roofing system. The type of repairs required for this damage depends on the size and severity of the damage.

Missile damage refers to cuts, gouges, dents, and abrasions to the coating and SPF caused by materials such as tree branches, signs, parts of other buildings (*e.g.* shingles, metal panels, flashings, doors, and windows), and many other non-secured items hitting the roof during a windstorm. Consequently, damage from wind-driven missiles is likely to be quite varied, depending on the items that strike the roof.

Small cuts or gouges (less than 76 mm [3 in.] in diameter) in the SPF can be repaired by caulking the holes after the damaged material is removed. Larger damaged areas should be repaired by removing the impacted sprayfoam, applying new material and coating to the void.

Wind damage may be isolated to small areas of the roof or cover large areas. **Thomas Smith**, AIA, noted in his observations of SPF roofs struck by Hurricane Andrew, "It appears a thickness of 50 mm (2 in.) [of foam] is sufficient to prevent penetration of most missiles."

Damage most likely to occur to SPF roofing systems during a hail event include cracks, punctures, and dents to the roof surface. Both the protective covering/coating and the SPF can be damaged. When hail strikes an SPF roof, cracks shaped like crow's feet or semi-circles may appear on the coating surface.

The diameter of the cracks can be used to determine the hailstone size. Depending on the size, weight, and shape of the hail, the SPF may be dented as well. The depression will typically range from 3 to 19 mm (1/8 to 3/4 in.) in depth. Hail damage can be isolated to small areas or cover the whole roof. Determining short or long-term repairs depends on identifying the severity of the damage. It is important to note both the size and quantity of hail dents and cracks. For example, 15 dents with a 76 mm (3 in.) diameter on a 9-m^2 (100-sf) roof may be less problematic than hundreds of 19-mm (3/4-in.) diameter dents.

Sometimes, cases of mechanical damage are not discovered for months or even years after the damage occurred. In these circumstances, repair procedures differ depending on the extent of ultraviolet (UV) degradation of exposed foam and moisture absorption of the roof. Any UV-degraded or moisture-laden SPF in the cuts, cracks, and dents should be removed and caulked. If the cuts, cracks, or dents are too numerous to remove and caulk, the affected areas should be scarified, refoamed, and coated.

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