Roofing

Roofing With Resilience in Mind

As climate conditions change, the installation of durable, weather-resistant structures is more important than ever

By Howard Riell, Contributing Writer

The rise of resilient roof installations on institutional and commercial facilities has mirrored the growing intensity and frequency of natural disasters that threaten facility operations and occupants.

Upgrading to high-performance roofs offers advantages such as energy savings, improved durability and reduced environmental impact. Whether installing cool roofs, green roofs or metal roofing, each option brings specific benefits depending on a facility's needs. With careful planning by maintenance and engineering managers, a well-executed upgrade can deliver long-term financial and environmental benefits while ensuring that buildings remain functional and comfortable.

Money-saving opportunities

In addition to keeping occupants and systems safe, resilient roofs also can deliver financial benefits to facilities.

"We view resilient roofing as both an innovative engineering solution and a long-term financial strategy," says Channing Baker, president and CEO of Evolve Contractors. "As specialists in single-ply roofing systems, we focus on upgrading buildings to high-performance assemblies that are tailored to each facility's unique needs."

Baker says managers need to understand the full parameters of the building, including the condition of the existing roof system, the local climate and the way the facility is used before choosing a roof system designed to withstand the local conditions. Taking a diagnostic approach allows managers to specify a customized recommendation that enhances building performance and achieves long-term goals.

A roofing system that "not only protects against weather and water intrusion but also stabilizes interior conditions improves energy efficiency and extends the overall building lifecycle, ultimately delivering measurable value to the end user," Baker says.

Hardening roof coatings can serve as temporary, cost-effective strategies for revitalization projects.

"However, the risk level is significantly higher because surface preparation and installation are highly specialized processes that must be executed meticulously and flawlessly

High-performance roofs can offer managers benefits that include energy savings, durability and sustainability.

to achieve long-term performance," Baker says.

Managers who implement systems should maintain robust quality assurance vs. quality control (QA/QC) reporting and management process throughout installation to ensure all products are applied correctly and comply with manufacturer specifications. As with single-ply systems, weather conditions, surface temperature and site conditions play critical roles in the success and longevity of roof coatings. Attention to these factors determines whether the installation delivers short-term relief or lasting resilience.

"We have seen that improving QA/QC and reporting not only saves the owner time and money long-term but helps streamline coordination, thus improving the work environment and chances to optimize success," Baker says.

Environmental footprint

The environment is a major consideration for managers who want to undertake a roofing project with resiliency in mind.

"As environmental sustainability becomes a growing concern, industries are continually seeking innovative solutions to reduce their ecological footprint," says Ralph Paroli, technical director for the Roof Coatings Manufacturers Association.

Roof coatings have emerged as an effective strategy for enhancing energy efficiency and mitigating the adverse effects of urbanization, particularly by reducing the urban heat island effect, which refers to the higher air temperatures in urban areas compared to rural areas due to heat-absorbing materials, including asphalt and concrete. The phenomenon increases energy demands, air pollution and public health risks.

"Building owners frequently face the choice between tearing off an existing roof or repairing it," Paroli says. "Annually, approximately 2.5-billion square feet of roofs are either replaced or re-coated."

Since roofing materials are the third-largest contributor to landfill waste, coatings offer "an ideal solution to extend the lifespan of roofs and prevent unnecessary waste," he says. "Notably, cool roof coatings play a crucial role in promoting sustainability."

The U.S. Environmental Protection Agency says cool roofs, including reflective roof coatings, can mitigate this effect by reflecting more sunlight and absorbing less heat.

For example, a clean white roof reflecting 80 percent of sunlight remains about 55 degrees cooler than a gray roof reflecting only 20 percent. Similarly, a cool-colored roof reflecting 35 percent of sunlight stays about 22 degrees cooler than a traditional roof reflecting just 10 percent.

"Reflective roof coatings help reduce the urban heat island effect, lower peak energy use and decrease carbon footprints," Paroli says. "They also reduce smog by decreasing greenhouse gas emissions and minimizing roofing waste going to landfills."

Roof coatings also can extend the lifespan of roof membranes by keeping them cooler and protecting them from ultraviolet light damage, chemical exposure, acid rain and pollution.

"Proper maintenance, combined with roof coatings, can significantly delay the need for complete roof replacement, aiding in budget management and promoting sustainability by reducing landfill waste," Paroli says.

Craig Hargrove, president of technical services for Hoffmann Architects + Engineers, say coatings can be critical elements in the resilience of their facilities.

"When determined to meet the requirements of a specific project, hardening coatings can serve as a durable, sustainable, and waterproof protection of a new high-performance roof," he says. "As such, they become an integral part of a system that can improve asset resilience by reducing energy usage and operating costs, extending the life cycle of building components and preserving the embodied energy of the built environment."

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Avoiding mistakes

The most common mistake that Baker's team sees is managers treating the roof as a set-it-and-forget-it system.

"A roof is a living part of the building envelope," Baker says. "It expands, contracts, and weathers daily. Unfortunately, this mindset is often mirrored by architects, who sometimes confuse details with specifications and leave critical cost-versus-practicality decisions to contractors during bidding."

Failing to perform preventive maintenance and regular condition assessments can lead to premature failure, costly leaks and warranty disputes.

Another major error is specifying materials or assemblies based solely on upfront cost rather than on lifecycle value. A lower-cost roof often becomes more expensive in the long run due to higher energy consumption, frequent repairs and early replacement.

Finally, many owners rely on coatings or patchwork solutions without addressing underlying issues such as poor drainage or substrate deterioration.

"By extending roof life and reducing tear-offs, they help minimize landfill waste and carbon footprint, key priorities for modern facility management," Baker says. "The future of resilient exteriors isn't just about materials that last. It's about systems that evolve with the environment and that are durable, efficient and adaptable to the changing climate." ■

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