Cool roofing doesn't always mean reflective roofing

By George Evanko, EPDM Roofing Association

For the past decade, reflective roofing materials have stolen the headlines in terms of energy-efficient roofing. Organizations such as the Cool Roof Rating Council (CRRC) and the U.S. Department of Energy and its ENERGY STAR program have been diligent in their efforts to promote the benefits that a reflective roof system provides, which are primarily reduced rooftop temperatures and subsequent reductions in air conditioning usage.

However, we appear to be entering a new phase in the drive to create energy-saving roof systems. The regulatory bodies that have been implementing the rules under which building professionals operate are expanding the options available to those professionals as they plan their systems. If more agencies follow suit, it will soon be possible to develop energy-saving roof systems using the most logical and effective materials in every region of the country.

Recently, the Single Ply Roofing Industry (SPRI) funded a three-year study (available at www.SPRI.org), conducted at the Oak Ridge National Laboratory (ORNL), to determine if ballasted roof systems offer similar energy-efficiency benefits as reflective roofs.

Ballasted systems were the first type of installation used when single-ply roof systems entered the commercial roofing market over 45 years ago. For decades they grew in popularity, and over the past four decades have averaged 250 million s/f of installations per year. Recently however, the reflective roofing movement has changed the perception of what a quality roof system is, and ballasted systems have taken a slight fall from grace, but that is likely to change in light of the SPRI study.

Concluded in 2008, the SPRI study reached the following conclusions:

• The cooling loads for the heavy and medium stone-ballasted and uncoated paver-ballasted systems were approximately the same as for the white system.

• Cooling loads for the lightweight stone systems were slightly larger than for the white system but significantly less than for the black system.

• By the start of the second year of the project, temperature and cooling loads increased for the white system due to the effects of weathering.

• Heating loads for the ballasted systems showed random variation as loading increased and type changed. Except for the heavyweight stone system, they were about the same as for the white system.

• The heavyweight stone system showed slightly less heating load than the black system but this is considered an anomaly due to rain effects.

Rooftop ballast plaza on the campus of Colgate University

• All evidence on clear days of diurnal behavior showed the heavyweight stone and uncoated paver systems performing equally due to the same thermal mass despite different solar reflectance.

In the report summarizing the study's results, André Desjarlais, program manager of the Building Envelopes Program at ORNL, stated that certain ballasted roof systems "are as effective as white-membrane roofs in mitigating peak energy demand."

Based on this evidence, it was clear that ballasted roof systems should be allowed as a cool roof option in the standards set by the various regulatory bodies across the country. As the executors of these bodies learned more about the performance of ballasted roofs, some have agreed to adapt their standards accordingly.

Earlier this year, Chicago added an exception to its code that allows certain ballasted roofs to be used in lieu of mandated reflective materials. The action in Chicago follows a similar decision by the California Energy Commission (CEC) and a tentative decision by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), to update their "cool roofing" standards and recognize ballasted roof systems as an acceptable alternative to light-colored materials.

"The roofing community is increasingly emphasizing sustainability and energy efficiency, however the reflective roofing movement seems to have blurred many people's vision as to how best reach those goals," said Samir Ibrahim, director of design services for Carlisle SynTec. "Ballasted roofs have been an effective solution for decades, and the actions of the City of Chicago and other code-adopting bodies are proving that these systems have value in our nation's move toward designing truly energy-efficient rooftops and buildings."

In cooler climates, such as found in Chicago and New York, the major goal of energy savings will be to reduce heating costs. In that situation, a ballasted roof would likely best achieve that goal because the ballast retains the sun's heat energy during colder months. Most importantly, a wider range of options will likely lead to better decisions and results, which is, after all, what everyone is seeking as they strive to reduce energy consumption in commercial buildings.

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