ASPHALT LOW-SLOPED ROOFING:

Enduring the Test of Time?

By Lynn Picone

INDUSTRY WORKHORSE

Asphalt roofing systems have remained the workhorse of low-slope roofing installations for years, and for good reason: they are proven performers. Well known for their long-term durability, even in harsh installations, asphaltic roof systems have endured as a popular membrane choice for more than 150 years. In a 2008 industry study, bituminous roofing made up 44% of all low-slope roofing demand, with elastomeric single ply (EPDM) trailing a distant second at 24%.[1] But with an increasingly competitive environment, can asphaltic systems hold up to the competition? Over the past five years, market share for built-up roofing (BUR) and modified combined has dropped 74%, while thermoplastic polyolefin (TPO) has grown 160%.[2] That shift in preference seems to beg the question: Will asphaltic systems continue to hold a significant presence in a changing market?

CONTRACTOR PREFERENCE

When asked what roofing system he most relies on, Dale Sloan, vice president of Greensboro Roofing, Greensboro, NC, didn't hesitate. "We like asphaltic roofing systems because we can count on them." Sloan's comments are a clear demonstration of why asphaltic roofing remains a popular choice, even in a time when alternative membrane systems are turning up the competitive heat. Sloan is a 17-year veteran of the industry, with experience in installing many different technologies. He looks to asphaltic systems when property owners express a desire for the "best roofing system."

"Don't get me wrong," Sloan continued, "Other systems have their place. For instance, single plies [are] quicker and cheaper to install, and they're popular now because of the initial installed cost advantage and [for] their reflective surfaces."

The rise in single-ply systems is driven primarily by cost factors and the increased desire for reflective roofing options. While installed costs vary widely by region and market, in general, depending on roof layout, a 45-mil TPO roof may have a lower initial installed cost. For instance, in the Midwest, the initial installed price tag for a TPO system can be as much as 40% less than a four-ply BUR. But how does that price difference factor when it comes to the overall value of the investment?

Sloan continued, "In our market, we face a variety of weather-related challenges: tornados, hurricane-force winds, and hail and storm damage that can really take a toll on a roofing system. And if weather isn't enough, property owners may not always be able to protect their property from damage caused by physical abuse. In densely populated urban areas, a roof system may be exposed to a lot of unexpected traffic, where damage by debris and abuse can cause leaks. The redundancy provided by multiple layers of asphalt and felts or asphalt and modified bitumen membranes give our owners a greater peace of mind, knowing that there is something more than a single ply of roofing protecting their businesses and investments."

Terry Glidewell, owner and president of Greensboro Roofing Company, added, "In my 32 years in the commercial roofing industry, I have seen many 'state of the art' roof systems come and go. It seems, after these systems have been around for five to seven years, owners and specifiers come back to the asphaltic systems to ensure the long-term performance they expect, which the other systems did not provide."

But Ken Kelly, president of Kelly Roofing and Energy Saving Solutions, Naples, FL, countered, "TPO is without question the fastest growing single-ply system available …Without the labor-intensive installation of EPDM or the environmental concerns of PVC, TPO offers the durability of a heat-welded seam, resistance to ponding water, and, most importantly to me, the energy savings and reflectivity my customers demand."

No matter which roof system a property owner may select, in comparing technologies, it is imperative to understand installation methods and key benefits of each product type and installation method. Understanding key elements like investment options, property use, location, and building construction, along with the risk associated with roof leaks and repairs, will help property owners narrow choices and determine the best roof system for their individual needs.

Don Portfolio, president of PRI Construction Materials Technologies, commented on the performance criteria of asphaltic and TPO systems and shared his thoughts based on technical performance merits as defined by the American Society for Testing and Materials (ASTM) criteria.

This downtown Dallas building was renovated into luxury condos. The developers wanted it to be seen by the high-rise buildings around it. Construction: Iso set in OlyBond 500, Liberty SA, SBS heat-weld 25, SBS heat-weld FR seen as white, Torch Plus FR seen as black.

"Tear strength, tensile strength, and impact resistance are common criteria we are asked to determine and evaluate. Test methods vary by material for evaluation of similar properties. An aggregate-surfaced BUR exhibits a significantly higher impact resistance than a TPO membrane under similar conditions. A two-ply modified bituminous membrane roofing system will also demonstrate this better impact resistance. The tensile properties of BUR glass fiber felt roofing systems also demonstrate high tensile values and fairly low elongation. The low elongation is offset by the high tensile [properties]. Modified bituminous two-ply membrane systems – especially the polyester reinforced systems – demonstrate high tensile and elongation [properties]. The tear resistance of both BUR and modified bituminous roofing systems are high, as well."

Portfolio continued, "Certainly the reflective characteristic of white TPO is visually obvious, but the reflective properties of both BUR and modified bituminous systems can be adjusted by using light-colored aggregate on the BUR, by coating a smooth-surfaced BUR, or by coating a membrane either in the factory or in the field."

DATA SUPPORTS OUTSTANDING PERFORMANCE

As it relates to long-term durability, Greensboro Roofing's opinions are supported by data collected in the *Hurricane Katrina Wind Investigation Report* released by the Roofing Industry Committee on Weather Issues (RICOWI) in September 2007. As part of the Wind Investigation Program (WIP), RICOWI (whose participants include members of RCI, academia, and testing facilities), evaluated the damage caused by the storm on various roofing systems.

The group evaluated approximately 30 asphaltic commercial roof systems (both modified bitumen and BUR) and concluded that asphaltic systems performed well in the fierce storm conditions. The storm varied in intensity from a Category 1 to a Category 5 hurricane as it tromped across Florida, Mississippi, and the Gulf of Mexico. The coastal area of Mississippi that was studied had recorded winds in the 120 - 130 mph range. The study reported that, in general, little or no damage was observed. Where damage was present, it was limited to edge details and minor scouring of aggregate surfacing. When major damage was noted, it was typically due to a poorly attached system component, such as the structural deck or cementitious wood fiber roof panels. The report results stressed that all members of a composite system must be attached to resist uplift.

INDUSTRY PROFESSIONALS AGREE

Mike DiStefano, vice president of operations and business development at Continental Materials, explained, "Asphalt is not just an excellent waterproofing component, it is an excellent adhesive. A good adhesive requires both strong cohesive and adhesive strength (the ability of materials to bond to themselves and to a substrate). In the course of a common roofing installation, asphalt is heated, then cools, which allows it to exhibit the cohesive and adhesive properties needed to meet uplift requirements in systems. In addition, when compared to latex- or urethane-based adhesives, asphalt has proven to be a very cost-effective adhesive over time."

Modified bitumen and BUR systems are respected within the roof consultant community as well; Ken Hunt, RRC, RRO, vice president of technical services, RoofConnect, and a past chairman of the Asphalt Roofing Manufacturers' Association's (ARMA) Low-Slope BUR - Modified Bitumen Roofing Committee, added, "One of the many roles of both contractors and roof consultants is to help their clients choose the right roofing system for their needs. In my experience, clients with a low risk tolerance look to the redundancy of asphaltic systems that have performed over the years. Schools and other public institutions prefer roof systems that have a proven track record for a long-lasting, dependable service life. They often expect systems to perform for 20 years or even longer if they are routinely and properly maintained. For clients like these, when it is time to consider a recover or reroof, I recommend they consider the installation of a roofing system that they know has worked well for them in the past. This may be either a multiple-ply built-up or modified bitumen roof system."

SURVIVING TOUGH ECONOMIC TIMES

When budgets are strapped, how does asphaltic roofing compete against other technologies that may appear to property owners to be an equal value but have a lower initial price tag? For Greensboro Roofing, it goes back to understanding what their customers are really asking for. "It's about making sure their businesses aren't disrupted by roof leaks, that they can plan effectively, and that they don't see unexpected capital expense because a roof didn't perform as they believed it would. It's about investing in their business. Like any major expense, it's about getting the best value for their money," explained Sloan. "We take pride in the fact that we listen to our customers and, if a problem does occur, we are right there to respond."

In 2007, a major survey[3] conducted by Clear Seas Research evaluated the roofing needs as determined by key decision makers of commercial properties. It reveals some similar information about what is important to property owners.

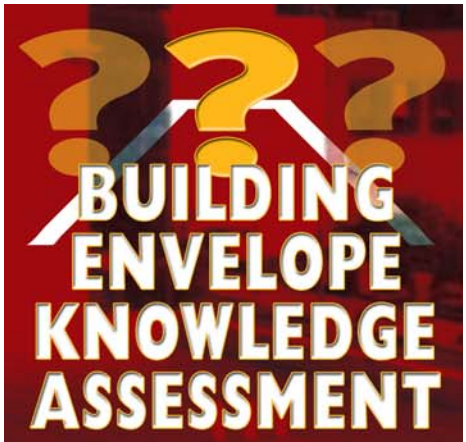
Budgets are a huge issue for commercial roofing buyers and decision makers. In fact, 29% of expenditures were not even budgeted. Specifically, 20% of roof replacements, 25% of consulting, and 40% of roof maintenance and repairs were not budgeted. The results were worse in the 2004 study, when a total of 32% of all roof-related services were unbudgeted.

As it related to the value proposition, many believed the commercial property owners will always seek the lowest price as their primary specification criteria. Clear Seas Research refutes that notion. Low bid was characterized as important by only 45% of the responders, which is lowest on their list of criteria. The 2004 study had similar results.

By design, the redundant compositions of asphaltic roof systems help provide the reliable performance property owners seek. In addition, it helps owners plan effectively for maintenance and repair expenditures. And when it does come down to a roof replacement, it is always important to compare apples to apples when reviewing competitive bids.

ADAPTING TO A CHANGING MARKET

While asphaltic products may be mature product lines, they aren't hiding their heads in the sand waiting for competitive systems to take over. To adapt to evolv-



Test your knowledge of building envelope consulting with the following questions developed by Donald E. Bush, Sr., RRC, FRCI, PE, chairman of RCI's RRC Examination Development Subcommittee.

1. **What are the basic exterior wall types commonly used in the United States?**
2. **How do these wall types resist internal penetration of exterior moisture into the dry zone of the wall construction?**
3. **What are the common elements of an exterior wall system?**
4. **Damp-proofing materials are primarily spray- or roller-applied bitumen-based coatings applied up to 10 mils in thickness. On which side of the structural element is damp-proofing always applied?**
5. **Waterproofing membranes can be categorized into four types. What are the four types?**
6. **Below-grade enclosures of a building are typically composed of three main elements. What are the three elements?**

Answers on page 16

BUILDING ENVELOPE KNOWLEDGE ASSESSMENT

Answers to questions from page 15:

1. **Cavity walls, barrier walls, and mass walls.**
2. **CAVITY WALLS rely on a designated interior drainage plane as the primary defense and exterior cladding that is intended to shed or absorb the majority of bulk rainwater penetration.**

   BARRIER WALLS rely principally upon the weather-tight integrity of the outer-most exterior wall surfaces and construction joints.

   MASS WALLS rely principally upon a combination of wall thickness, storage capacity, and, in masonry construction, bond intimacy between masonry units and mortar, to effectively resist bulk rainwater penetration.
3. **Exterior cladding, drainage planes, air barrier systems, vapor retarders, insulating elements, and structural elements.**
4. **The positive (wet) side.**
5. **Cementitious systems, fluid-applied systems, sheet membrane systems, and Bentonite clays.**
6. **Foundation walls, floor slabs, and plazas/tunnels/vaults.**

REFERENCE:
***Building Envelope Design Guide (WBGD)*, NIST**

ing owner needs, many manufacturers have introduced energy-efficient reflective membranes, and self-adhering (SA) products are shifting from primarily residential applications to full acceptance in the commercial market.

Chris Griffin, technical director and portfolio manager for asphalt roofing at Johns Manville, said, "Legislation and preferences for reflective roofs have forced us to think differently about how to meet our customers' needs. Customers want the reflectivity but do not want to compromise on the roofing durability and integrity provided by multi-ply asphalt roofing. Factory-coated BUR and SBS cap sheets enable owners and contractors to install their preferred and proven roof systems while meeting codes and saving energy."

John Fisher, senior vice president of marketing, GAF Materials Corporation, said, "Asphaltic products introduced within the past five years, including reflective cap sheets and SA membranes, are on the fast track to become some of our most popular guaranteed systems. The integration of these types of components address the issues asphaltic systems are facing when compared to single-ply systems. Self-adhering base sheets speed installation, and reflective cap sheets keep asphaltic systems current with energy trends the market is demanding."

So are asphaltic systems poised to retain a strong, continued presence in the roofing industry? For many, the answer appears to be yes. Both BUR and modified bitumens have adapted to an evolving market and are viewed by contractors, industry professionals, and property owners as durable, reliable performers and a truly sound value.

FOOTNOTES

1. *Roofing*, The Freedonia Group Inc., Industry Study 2339, 2008.
2. ARMA and SPRI 2003-2008 share data.
3. Commercial Property Owners Survey, *Roofing Contractor,* February 2008.

Lynn Picone

Lynn Picone is senior product manager at GAF Materials Corporation, responsible for asphaltic and TPO self-adhering membranes, BUR, modified bitumen, and liquid-applied membranes. With 17 years' experience in the industry, Lynn holds the vice chair position on both the ARMA Communications Committee and Quality Asphalt Roofing Committee.

WHAT TO DO WITH OLD DIAPERS? MAKE ROOF TILES!

In Birmingham, England, Knowaste is building a recycling plant that will supply roof tiles made from recycled nappies, according to the online magazine ***Building*** (**www.building.co.uk**). Knowaste is a specialist in recycling diapers and adult incontinence products. The roofing products, which will be manufactured by Mailbox Mouldings and distributed by Knowaste' s spin-off company, Small Planet Building Products, use recycled plastic. The facility, due to open in 2010, sanitizes the waste to produce two outputs: plastic and cellulose organic residue for green energy.

The plastic will be made into a variety of products, including plastic cladding, decking, and roof tiles. Roy Brown, president and chief executive of Knowaste, said, " More than 750,000 tons of nappy waste are disposed of in the UK each year – a figure that highlights the importance of developing alternative uses for post-consumer nappies."

— www.building.co.uk