

Long Life and Severe Weather Performance – Reasons for Specifying Asphalt Roof Systems

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Millions of square feet of commercial buildings feature hot-applied asphalt BUR systems. There is a solid core of building owners, along with a network of roofing professionals, who continue to advocate hot-applied asphalt systems. Some things that drive continued demand for BUR systems include the desire by building owners for long roof system life cycles and the fact BUR systems are easy to maintain and perform well in severe weather.

Achieving Long Life

An informal survey conducted of roof consultants and building owners commissioned by the Quality Asphalt Roofing Council (QARC) shows a high level of agreement that a well-maintained hot-mopped BUR system often lasts 20 years or more [1].

The life expectancy of a BUR system depends on the commitment to routine maintenance on the part of the owner. Early detection is a key factor in roof system maintenance. Problem areas can be detected and fixed before they develop into leaks. Inspections can reveal situations, such as a loss of gravel, which could lead to felt erosion or brittleness. Less commonly, punctures and cuts to the membrane can occur, so it is wise to remove sharp objects and debris from the roof. Clogged drains or poorly sealed flashings also present problems that are repaired easily. The effects of chemical exhausts on roofing materials should be monitored.

These and other preventive maintenance actions can help catch problems before they damage larger areas of the roof system. Inspections should be performed not only on aging roofs but also on new roofs to guard against errors in installation, design or specifications. Early detection of defects often is the key to extending roof system life.

Severe Weather Performance

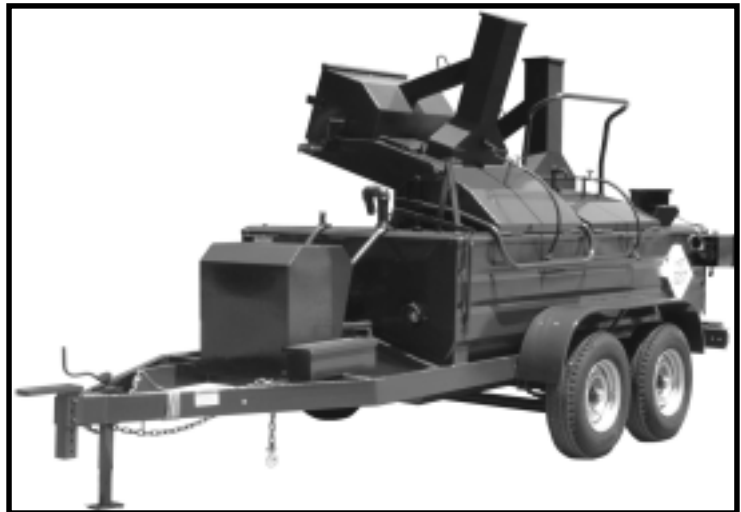
Building owners often opt for BUR systems because hot-applied BUR systems can offer better protection in severe weather than synthetic roof membranes. A BUR system has substantially greater mass than a single-ply system. A four-ply BUR system provides about 280 mils of waterproofing thickness whereas most single-ply systems average 60 mils or less. The multiple layers of a BUR system result in a thick, heavy membrane that can provide good protection against wind-uplift and penetration by windblown objects.

In addition, when asphalt is applied directly to a structural concrete roof deck or a hot-applied

asphalt roof system is applied to an insulated roof deck, it is considered to be a fully adhered system. An important benefit of fully adhered systems is they distribute typical building stresses (such as wind load, vibration and flexing) over an entire roof membrane.

Single-ply systems that are not fully adhered have fasteners designed to hold a roof membrane in place, but events such as high winds can produce stress concentrations, or point loading, strong enough to compromise the integrity of the roof or tear apart the roof membrane. Appropriate fasteners spaced closely together are used successfully in many roof systems. Liquid asphalt also adheres well when applied directly to certain surfaces, eliminating the need for fasteners. For example, asphalt can be applied directly to a structural concrete roof deck after priming. It often can be hot-mopped to thermal insulations though manufacturers' recommendations should be followed. Of course, liquid asphalt adheres well to the felts and base sheets used in the construction of a multiple-ply roof system.

Reports from heavily storm-damaged areas and actuarial data support the claim that BUR systems perform well in extreme weather. For example, the Roofing Industry Committee on Weather Issues (RI-COWI) Inc. recently reported on investigations of wind-related damage to low-slope roofs from Hurricanes Charley and Ivan. (The complete report, titled "Hurri-



Courtesy of Reeves Roofing Equipment Company

Fume recovery allows built up to be done where another type of roofing system might have been specified. According to Amy Reeves, consultants who specify BUR systems have seen a sharp decline in customer complaints when using this equipment.

canes Charley and Ivan Wind Investigation Report, March 2006," is available on RICOWI's Web site, www.ricowi.com.)

The report includes detailed case studies and photographs of 93 low-slope roofs that experienced damage ranging from minor to extensive. Roof system types studied include standing seam, metal, single ply, modified bitumen and BUR. Case studies in the report show many instances of BUR systems withstanding severe weather. Wind speeds from Hurricane Charley, in particular, were in the 120-mph to 150-mph range, yet in many cases BUR systems sustained only minor damage. In some cases, metal flashings were damaged but the BUR membrane remained intact.

Among other results, the report concludes: "All building envelope components are affected by weather-related aging; therefore, sufficient maintenance of buildings is important. The studies reinforce the need for secure roof edges, and codes that require secure roof edging need to be enforced. Wind-borne debris also was a major contributor to roof damage, and standards and enforcement are needed for attachment of all building envelope components (such as air-handling units) to reduce wind-borne debris."

Toward Better Installation

Proper training is essential to the management of a BUR system installation. The application of hot-applied asphalt requires a well-trained and skilled work force. At the same time, modern equipment is improving the quality of work, for example, by providing better control of asphalt temperature and viscosity during installation, as well as fume emissions.

Fume-recovery systems are used successfully during the application of asphalt roofing materials on schools, hospitals and other facilities where people or specialized equipment is sensitive to fumes. But these systems are relatively new to the industry. After first appearing during the 1970's, they were reintroduced in the early 1990's after much redesign and testing. These systems either burn up the smoke and fumes or capture them on filters. There are three basic types.

The first type has an afterburner attached to a regular kettle lid. It can be retrofit to existing kettles or

installed at the factory on new units. This system includes a safety device for loading. The second type has a burner that is separate from the kettle and connected to the kettle by a metal hose, which pulls the smoke and fumes into a fume-recovery unit. The third type also is separate from the kettle and connected with a metal hose. It uses a fan to pull the smoke and fumes into filters. In this case, a roofing worker periodically must dispose of the filters.

Maximum Performance

Every roofing project is different. A majority of low-slope commercial buildings are candidates for asphalt roof systems whether those roof systems are traditional hot-applied BUR, modified bitumen or a combination of the two.

Manufacturers of competitive roof systems may fuel speculation that BUR systems are obsolete. But multiple-layer asphalt roof membranes have great appeal to building owners and will continue to play a major role in the high-quality segment of the market where building owners demand systems that offer maximum performance and roofing contractors are willing to supply them.

References

1. Robert Almon, RCI Interface Journal, October 2006. Article available online by permission of RCI at www.asphaltroofing.org/news_inthenews.html.

About ARMA

The Asphalt Roofing Manufacturers Association (ARMA) is the North American trade association representing the manufacturers and suppliers of bituminous-based residential and commercial fiberglass and organic asphalt shingle roofing products, roll roofing, built-up roof (BUR) systems and modified bitumen roof systems. For additional information, visit www.asphaltroofing.org.

About QARC

The Quality Asphalt Roofing Council (QARC) is an initiative created to support and promote built-up and modified bitumen roof systems under the auspices of the Asphalt Roofing Manufacturers Association. The council is composed of roll goods producers, asphalt suppliers, equipment manufacturers, packaging suppliers and others.