Asphalt Additive Assures Continued Availability of BUR in Roofing Market

By Marty Boland

Conventional, hot-applied, built-up roofs (BUR) have long been considered the workhorse of the low-slope roofing market. The BUR family of components has seen relatively little change over the past 100 plus years, in sharp contrast to the ever-changing face of those systems that carry the balance of the market. BUR systems rely exclusively on air-blown asphalt, used as either an adhesive (insulation attachment) or the waterproofing component in a redundant assembly of reinforcing felt plies.

The evolution of the accepted practice for the installation of BUR systems has brought us from jute to organic to fiberglass ply felts; asphalts available by grade or type; improved insulation; hybrid mechanical fasteners; and an array of accessory flashings. The marriage of old-school roofing practice with modern materials of increased tensile strength and improved thermal and wind resistance has served this industry segment well, with successful installations in the billions of square feet. Like the saying, "Out of sight, out of mind," these roofs move through their service lives largely forgotten until such time as they are classified a liability and replacement is given consideration.

The debate begins with the building owner wading through the myriad of viable roof system options. Increasingly, we find the scales tipped, with owners, consultants, and contractors promoting alternatives to the tried and true BUR-based systems. Many building owners, consultants, and contractors have chosen single-ply, cold-process, and self-adhering systems over the conventional BUR product line to avoid the predictable issues centered on the disruption of facilities due to the objectionable odors associated with hot-mopped, asphalt-based systems. The unmistakable aroma of roofing asphalt emanating from the heating kettle or tanker has contributed to the loss of market share. Driving this, in part, are societal shifts in which building owners and occupants, as well as passers-by, are much less tolerant of interruptions to their daily activities. Similar disdain is found in road construction, traffic jams, and long lines at the grocery store. It is not unusual for building owners who have selected BUR systems for their facilities to be faced with a spate of complaints and employees calling in sick in the presence of these odors.

To date, industry attempts to resolve this problem have been limited to kettle-mounted afterburners and specialized material packaging that is supposed to blend with the bituminous material during the heating process, forming a skin over the molten material, and reducing the loss of asphaltenes into the atmosphere. While these systems may have resulted in a measurable reduction of odor near the heated source, little improvement was realized during the material transfer from the heated source to the point of application.

Now there is a product that has taken on the task of odor suppression at the molecular level. Roof Odor Solutions Additive, marketed by Continental Materials, Inc., essentially strips the heated bitumen of oxygen, retarding the process of oxidation. Oxidation at the molecular level results in the release of sulphur fumes and the signature odor associated with the heating, transfer, and application of hot bituminous

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Laboratory Test Report
June 21, 2005
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Odor Analysis: The first analysis was conducted immediately after the asphalt/additive blend had been made in the laboratory. Both the asphalt and the asphalt/additive blend were heated to 500°F. Five out of the five laboratory technicians on the panel preferred the smell of the asphalt/additive blend when compared with the asphalt without the additive. All commented that the odor of the treated asphalt was significantly diminished and more pleasant when compared to un-treated asphalt.

The asphalt and asphalt/additive blend were heated to 500°F and held at this temperature for eight hours. Five of the five people on the panel preferred the smell of the asphalt/additive blend when compared with the asphalt without the additive. All commented that the odor of the treated asphalt was still diminished and more pleasant when compared to un-treated asphalt.

Figure 1 – Laboratory report.

systems. The product is designed for use with all post-blown asphalts, ASTM D 312, Types I-IV.

Prescribed Use

There are two prescribed methods for treatment of asphalt lots. Previously filled holding tanks (kettles, tankers, etc.) on the project site require knowledge of vessel capacity to assure the proper ratios are achieved. The appropriate mix is one gallon (3.8 L) of additive to every 6,000 gallons (22,800 L) of liquid asphalt. As with standard roofing practice, once the correct ratio has been established, the asphalt in the vessel should be held in circulation. Marginal results have been reported with attempts to mix the additive in holding tanks without circulation systems.

Filling of empty tanks also requires a working knowledge of vessel capacity to establish appropriate ratios. With the tank empty, a portion of the additive should be introduced before the loading procedure. The balance of the pre-determined quantity of the additive should be introduced to the tanker in equal increments during the transfer of the asphalt from the transport to the tanker. For optimum results, the tanker must be equipped with an internal circula-

tory system that should remain active during storage. Tanker benchmarks based on predictable material usage must be monitored to assure that the appropriate ratios are maintained when new materials are introduced to the holding tank. For optimum results, a post-blown, in-line injection system is recommended. Through this system, the additive can easily be introduced incrementally in quantities consistent with the volume of new asphalt.

Product Testing

On June 21, 2005, asphalt treated with the additive was run through a series of ASTM-prescribed tests, with the following results. (See *Figure 1*.)

The most significant changes in material properties as tested are found in post-additive values for Cleveland Open and Pensky Martens Closed Cup flash points, with respective departures from the untreated asphalt published at 10 and 15 degrees F. A slight, one-degree Fahrenheit change was noted in the softening point temperature between the treated and untreated materials. The pen rating remained unchanged. These slight changes are no more significant than those typically occurring through the material handling processes beyond production, including distribution, transport, the repeated heating and cooling cycles, and the final installation.

Summary

In summary, the hot, mop-applied BUR industry segment may again be at a crossroads, hallmarked by the elimination of perhaps its most readily identifiable characteristic: its odor. Building owners, roofing service consultants, and contractors can again purchase, design, and install hot-applied BUR component assemblies in the absence of odor-related disruption of occupancies.

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