

# COAL TAR BUILT-UP ROOFING:

## A LEADING SOLUTION FOR THE 21ST CENTURY

BY KEVIN OCHIS

### IN AN ERA IN WHICH ALTERNATIVE ROOFING SOLUTIONS ARE BEING DEVELOPED, WHY CHOOSE COAL TAR?

Coal tar is still being chosen because it is one of the most durable systems available. Coal tar has a molecular structure that provides a natural resistance to water, ultraviolet rays, and chemicals – elements commonly found on a rooftop environment. Equally important is coal tar's cold-flow/self-healing property, a property offered by no other roofing product. Although it appears solid, coal tar roofing pitch has cold flow at normal rooftop temperature: the warmer the temperature, the greater the rate of flow. It is this ability to flow that allows the membrane to continuously adjust to changing conditions, sealing minor fractures and abrasions that could otherwise accelerate the membrane's aging process. Coal tar's resistance to harmful elements and its self-healing properties provide roofs with low maintenance requirements. It's not uncommon to find maintained coal tar roofs still performing after

40, 50, and even 60 years.

Longevity and resistance to hail, abuse, and fire are just a few of the reasons coal tar built-up roofing (BUR) systems have continued to be a reliable choice. When compared to some of the newer roofing systems, the importance of the redundancy of a multi-ply system with a flood coat and gravel surfacing should not be overlooked. The finished BUR system is often several times thicker than a single-ply system.

Although the preference for built-up roofing systems has been influenced by the introduction of numerous single-ply systems, the use of coal tar has also been affected by several perceptions that have proliferated in recent years. Coal tar – like silica (sand), wood dust, gasoline fumes, and other products used in the roofing industry – has components considered to be carcinogenic. What does this mean? If someone improperly uses these materials, he or she faces a potential risk. Experience tells us, however, that just as with these other materials, coal tar roofing products, handled properly, can be used safely. The industry provides specific handling and safety information to workers and handlers to help ensure proper use of such materials. The National Roofing Contractors Association, for example, has published a number of articles on health and safety.

Almost all roofing projects result in some disruption to building occupants. On occasion, odors are encountered by non-roofing-related personnel when the aroma of hot-

applied roofing materials such as asphalt or coal tar comes through open windows or air vents during roof construction. This has caused concern in some instances. Certain steps can be taken to reduce and control fuming, such as maintaining proper material temperatures and positioning kettles or tankers well away from building air intakes. Roofing work can also be performed when a building is unoccupied.

Another misconception relates to limited geographic applications for coal tar roofing systems. Coal tar roofing products and systems are available in all North American markets. Although there are some roofing contractors who choose not to install coal tar systems, there is a nationwide network of contractors who promote and install coal tar systems on a regular basis.

### BUILT-UP ROOFING SYSTEMS FOR THE NEXT CENTURY

Until recently, coal tar and asphalt built-up roofs (collectively referred to as BUR systems) represented the norm in the low-slope commercial roofing industry for more than a century. Technologies, including single-ply and polymer-modified bitumen (mod bit) membrane systems, have attracted a significant portion of this market. Most of these systems present a type of innovative change, though often, an innovation in one area compromises another. For example, systems that demonstrate an easier and faster installation often cannot match the long-term performance of systems that may take longer to install. On the other hand, a newer system, designed for long-term performance, typically carries a higher cost. Although customers would like the best of both worlds, building owners, specifiers, and roofing contractors will continue to be challenged to determine the true value of a roof and compare that to cus-



Workers applying a roof restoration coating.

tomers objectives and budget. Economical, durable, and long-lasting coal tar roof systems appear to once again be gaining the support of building owners and roofing professionals.

Coal tar BUR is also considered one of the best systems to install in applications with unique and specific requirements. Coal tar is an ideal product to use where a roof will be subjected to common or continuous standing water. In some cities, there are regulations identifying how fast water can drain off a roof in order

to avoid overtaxing sewer systems. Rooftop runoff management effectively increases the time of concentration of runoff derived from roofs, delaying runoff peaks, lowering runoff discharge rates, and sometimes even generating sewer cost savings. A coal tar system is also ideal for vegetated “green” roofs, where the system is going to be continually wet.

#### INDUSTRY BECOMES MORE COMPLEX

Things have changed significantly since the time when coal tar and asphalt BUR dominated the low-slope roofing market. The low-slope industry has become much more complex. A variety of different systems has flooded the marketplace, and building owners are now confronted with the decision of choosing between EDPM, PVC, TPO, Hypalon, mod bit, and BUR — just to name a few. Each has its own characteristics, physical properties, recommended uses, and performance history. While some of these roofing systems have performed well when installed properly, others have not lived up to customer expectations, often in unexpected ways. Asphalt and coal tar systems still play a vital role in the low-slope roofing industry. Asphalt plays a key role in BUR and mod bit systems. Coal tar, often thought to be a product of the past, is gaining popularity, not only in its traditional form as a built-up roof, but also in several other forms. Polymer-modified coal tar membranes and polymer-modified, mopping-grade coal tar pitches are gaining widespread market attention.

#### AN ECONOMICAL RESTORATION PROCESS

The top surface of a roofing membrane is the weathering layer. A key attribute of



*A worker applying a hot flood coat onto a BUR system.*

coal tar is its ability to be maintained and restored so that a well-cared-for roof can last almost indefinitely. However, it is important not to delay maintenance and/or restoration until the roofing system is beyond the point where it can be economically restored. It can be far more expensive to replace a roof than to properly maintain it, especially if the system is allowed to deteriorate to the point where the deck needs to be repaired or replaced, as well.

The objective of the restoration process is to keep the weathering layer performing its duty.

A facility that has implemented a roof management program will have an inventory that places each roof area into one of the following categories:

#### CATEGORY 1 – GOOD

These roofs appear to be in sound condition. They should be scheduled for periodic inspections, usually twice a year, in spring and fall. Regular inspections are key to keeping good roofs in sound condition.

#### CATEGORY 2 – MAINTAIN

These roofs will have reasonably minor problems, such as bare spots on graveled roofs, open laps in the flashing membrane, or deteriorated sealant at the counterflashing.

#### CATEGORY 3 – RESTORABLE

These roofs are in need of more than just minor repairs and can be returned to good condition with some reasonable attention. These may include a granulated membrane roof with surface cracking and loss of granules that is in need of a new surface coat and granules; equipment curb and wall flashings with deteriorated surfacing in



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need of resurfacing; and graveled roofs with bare spots that are in need of new flood coats.

#### CATEGORY 4 – REPLACEMENT

These roofs have extensive problems, and it would not be considered a good investment to spend capital trying to maintain or restore them.

#### RESTORATION OPTIONS

Before restoration can begin, one must first determine the type of bitumen used in constructing the roof system. One can determine the difference between coal tar and asphalt by the odor, a solubility test, or laboratory identification.

Before applying a restoration coating or flood coat and aggregate, the roof system must be properly prepared. The type of restoration coating to be used will be based primarily on the preferred method of application. A coal tar pitch, built-up, gravel-surfaced roof can be restored by using either a cold or a hot method. The cold process method typically uses a solvent-borne coal tar such as a resaturant (for organic felts) or a coal tar polymer coating. Due to the solvent-borne coal tar's unique

penetrating qualities, this material will be absorbed well into the structure of any coal tar BUR membrane, adding flexibility and new life to an aging system. In addition, there is no need for a roofing kettle, which is preferable in some situations due to the building owner's preference or the logistics of the project. A new flood coat of hot coal tar roofing pitch can also be used. A flood coat doesn't have the extended cure time of a solvent-borne product and it is usually more economical than a coal tar resaturant or other solvent-borne coating, especially for larger roof restorations.

#### RESTORATION COATING OR FLOOD COAT AND AGGREGATE APPLICATION

Prior to the application of a restoration coating or new flood coat and aggregate surfacing, all necessary repairs should be made, including replacing any wet insulation and replacing or making appropriate repairs to deteriorated parts of the roofing system, typically matching the original system to the greatest degree possible. If the restoration (coal tar resaturant, coal tar polymer coating, or flood coat and aggregate) is going to add weight to the system, then consideration should be given to whether the existing structural components can handle the additional load. After the preliminary preparation has been completed, the surface receiving the restoration coating must be dry and free of any dirt or loose debris. The rates and procedures of application vary between coatings and manufacturers. Typically, the loose aggregate is removed from the surface, the coating or new flood coat and aggregate is applied, and new aggregate is embedded.




*The layering technique for applying the reinforcing plies, topped with aggregate embedded in a flood coat of coal tar roofing pitch, maximizes the life span of this roofing system.*

#### CONCLUSION

Coal tar BUR systems offer building owners a variety of benefits. On a life cycle cost basis, there are few commercial roofing systems that have outperformed coal tar.

Years of service, coupled with maintenance cost and all other factors commonly included in the life cycle equation, determine a product's life cycle cost. Pound for pound, coal tar has traditionally been more expensive than its asphalt counterpart. On the other hand, due to the slope requirements, the installed cost of a coal tar system can be less than an asphalt or single-ply roofing system. Because of coal tar's inherent resistance to water, slope is not a prerequisite. Coal tar suppliers offer warranty coverage, which does not exclude ponded water areas.


Coal tar is alive and well, has an unparalleled performance history, and continues to offer benefits that have often been overlooked in recent years. Coal tar is receiving well-deserved consideration by the quality- and cost-conscious consumer. 

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