

Community Update -

Roofing Odor Concerns – FAQ's

Q- Why did the owner choose to install an asphalt roof in the first place?

Most developers & property owners look to use construction funds in the most efficient way possible. This is especially true when public funds are used for construction. When considering a roofing system, they look at a number of factors that make up the total costs of a roof. These include much more than just the initial installed cost. The total lifecycle cost of a roof includes maintenance costs, the anticipated life expectancy of the roof, the durability and the energy impacts of the roof system.

After analyzing all of these factors they chose an asphalt built up roof system. This decision coincides well with the guidelines that the Federal government uses when determining what roof systems to use on all Department of Defense buildings. Notice these comments about asphalt built up roof systems from the Unified Facilities Criteria (UFC) – Roofing UFC 3-110-03:

2-8 GUIDANCE FOR ROOF MEMBRANES.

2-8.1 Asphalt BUR Membranes. BUR systems have broad applicability for dependable low-slope roof systems with low service life cost. Consider this roof system unless it can be shown that it fails to meet important design criteria. Positive attributes of BUR membranes include:

- Durability with long service life
- Low maintenance

- Well-understood maintenance procedure [1]

Another advantage of an Asphalt BUR (built-up-roof) is its superior resistance to hail damage which is particularly important in many parts of Texas. Notice the results of an in-depth study into how roofs performed during the 2011 hail storms that hit Dallas, TX. The study was performed by the Roofing Industry Committee on Weather Issues, Inc. (RICOWI).

On May 24, 2011 three rounds of thunderstorms containing large hail and tornadoes passed through portions of north Texas including the Dallas/Fort Worth metropolitan area. Several of the thunderstorms were supercell variety containing very large hail.

There were large areas of the two counties where hailstones from one to two inches in diameter were reported. A Dallas Morning News article quoted an insurance industry spokesman, Mr. Jerry Johns of the Southwestern Insurance Information Service, that the damage from the hailstorms could reach several hundred million dollars.

A data form was developed to record pertinent information from each site. Data included location, roof construction details, generic roof material descriptions, roof pitch, estimated maximum hailstone size at the site, and the type(s) and severity of hailstone impact damage to the roofing product.

Impact effects were listed on a scale of 0-5:

0. No apparent damage.
1. Surface impact marks without fractures or punctures.
2. Minimal damage (low severity and low quantity).
3. Moderate amount of fractures, punctures, or spalling.
4. Moderate/severe denting of metal roofing.
5. Severe damage resulting in potential leakage.

A.1. BUILT-UP ROOFING (BUR)

BUR roofs appeared to perform well. Five of the six roofs inspected were impacted by hail of 2.25 inch or larger and one roof was impacted with 1.75 inch hail. All were rated with damage levels 1 or 2, indicating little observable damage and general good performance. Observations included scuffing and some gravel displacement by hail impact.

A.2. MODIFIED BITUMEN

A total of seven modified bitumen membrane roofs were inspected in the study. They were impacted by hail from 1.75 inch to 5 inch in diameter with four of the seven being rated at damage level 5 indicating they were severely damaged. One roof exposed to 2 inch hail had no damage.

A.5. SINGLE-PLY SHEET MEMBRANES

Three low slope single ply membrane roofs were inspected. One roof was rated to have damage level 5 that was impacted by 1.75 inch hail; this roof had multiple temporary repairs over the reported fractures in the membrane so the actual damaged areas could not be observed. Another roof was rated damage level 3 (moderate amount of fractures or punctures) when exposed to 2.5 inch hail. One single-ply roof did not have any visible damage (level 0) when exposed to 2 inch hail. [2]

Given all of these facts, the school district chose the roofing system with the best combination of installed cost, low maintenance costs, overall lifecycle cost and durability.

Q - Are Asphalt roofs and TAR roofs the same things?

No, asphalt built up roofs are often mistakenly referred to as tar roofs. Notice these comments from Wikipedia on Asphalt:

The great majority of asphalt used commercially is obtained from petroleum. Nonetheless, large amounts of asphalt occur in concentrated form in nature. Naturally occurring deposits of asphalt/bitumen are formed from the remains of ancient, microscopic algae (diatoms) and other once-living things. These remains were deposited in the mud on the bottom of the ocean or lake where the organisms lived. Under the heat (above 50 °C) and pressure of burial deep in the earth, the remains were transformed into materials such as asphalt/bitumen, kerogen, or petroleum.

Natural deposits of asphalt/bitumen include lakes such as the Pitch Lake in Trinidad and Tobago and Lake Bermudez in Venezuela. Natural seeps of asphalt/bitumen occur in the La Brea Tar Pits and in the Dead Sea.

Asphalt/bitumen can sometimes be confused with "coal tar", which is a visually similar black, thermoplastic material produced by the destructive distillation of coal. During the early and mid-20th century when town gas was produced, coal tar was a readily available byproduct and extensively used as the binder for road aggregates. However, since the 1970s, when natural gas succeeded town gas, asphalt/bitumen has completely overtaken the use of coal tar in these applications. Other examples of this confusion include the La Brea Tar Pits and

the Canadian oil sands, both of which actually contain natural bitumen rather than tar. Pitch is another term sometimes used at times to refer to asphalt/bitumen, as in Pitch Lake. [3]

Asphalt is considered an excellent alternative to coal tar pitch for the following reasons:

There are several alternatives that have significantly lower, or no, PAH content. **Asphalt-based sealcoat has 1/1000th the PAH content of coal tar**, and is readily available at similar cost. [4]

This article in USA Today highlights the safety differences between asphalt and tar:

"We're at a tipping point" in the movement against coal tar sealants, says Nick Kelso, owner of Minnesota-based Jet-Black International. His seal-coating company, which has franchises in 13 states, is phasing out its use of them. **He's turning to the alternative: asphalt-based products that he says are improving, cost about the same and contain much lower levels of worrisome chemicals.** [5]

Asphalt and Tar are very different in chemical makeup and safety. Coal tar was a popular roofing product in the past but is rarely used now. Please be assured that there is no coal tar being used on this roofing project.

Q - What is oxidized asphalt?

Asphalt that has been treated by having air blown through it at high temperatures, making it suitable for use in roofing, hydraulics, pipe coating, membrane envelopes, and undersealing. [6]

Q - What is reduced smell Asphalt?

Most people do find the smell of asphalt to be unpleasant. In an effort to address this, reduced smell technology was invented. Reduced Smell Asphalt does not merely hide asphalt odors, but instead encapsulates and prevents the release of low-end asphaltenes (that

produce odor). By encapsulating asphaltenes, this technology stops the evaporation of lighter petroleum molecules, thus reducing fumes and odor without impacting performance.

Q - So, why can I still smell it?

Roofing Asphalt is made from the asphalt flux that remains after crude oil is refined and the lighter gases are removed. As such, it comes from a product that is developed by nature over long periods of time. This means that the raw materials used to create roofing asphalt can change slightly from batch to batch. This natural variance in the raw materials can make some batches more or less smelly than others despite the use of reduced smell technology.

Q - Don't asphalt fumes cause cancer?

Here are the results of over 20 years of research into that very question:

The question whether asphalt fumes cause cancer in workers has been the subject of considerable scientific investigation and debate for more than twenty years. The views of regulators and authoritative scientific groups differ. For example, the International Agency for Research on Cancer (IARC) recently announced that it has classified "occupational exposures to oxidized bitumens and their emissions during roofing" as "probably carcinogenic to humans." In contrast, the American Conference of Governmental Industrial Hygienists (ACGIH) has concluded that asphalt fumes are "not classifiable as a human carcinogen."

These differing assessments are based on studies of workers, whose exposures are generally much higher, and certainly of far greater duration (years rather than hours), than those of building occupants. We are aware of no regulatory or authoritative scientific body that has found that asphalt roofing fumes pose a cancer hazard to building occupants. [7]

What are the results of studies done on those who are exposed to asphalt fumes every day? An exhaustive

study was recently done into the cancer risk of those who work in asphalt plants. Here is a table that demonstrates the findings:

Notice the conclusions drawn:

“The big picture message is asphalt roofing products can be installed safely by roofing workers and, by extension are safe to other workers and the general public whose exposures are far lower.” [8]

If I can smell asphalt fumes am I being exposed to something dangerous?

Notice these important points from the document “Some Questions And Answers About Short-Term Non-Occupational Exposures To Asphalt Fumes Created During Roofing Jobs” produced by ARMA:

Some of the compounds in roofing asphalt fumes (e.g., sulfur) have very low odor thresholds (in the parts per billion range). An odor threshold is the lowest concentration at which the odor of a substance can be detected by people, and this concentration is well below the levels associated with adverse health effects for these compounds. For building occupants and others in the proximity of a hot asphalt roofing job, smelling the odors of the asphalt does not, by itself, indicate a harmful exposure. [7]

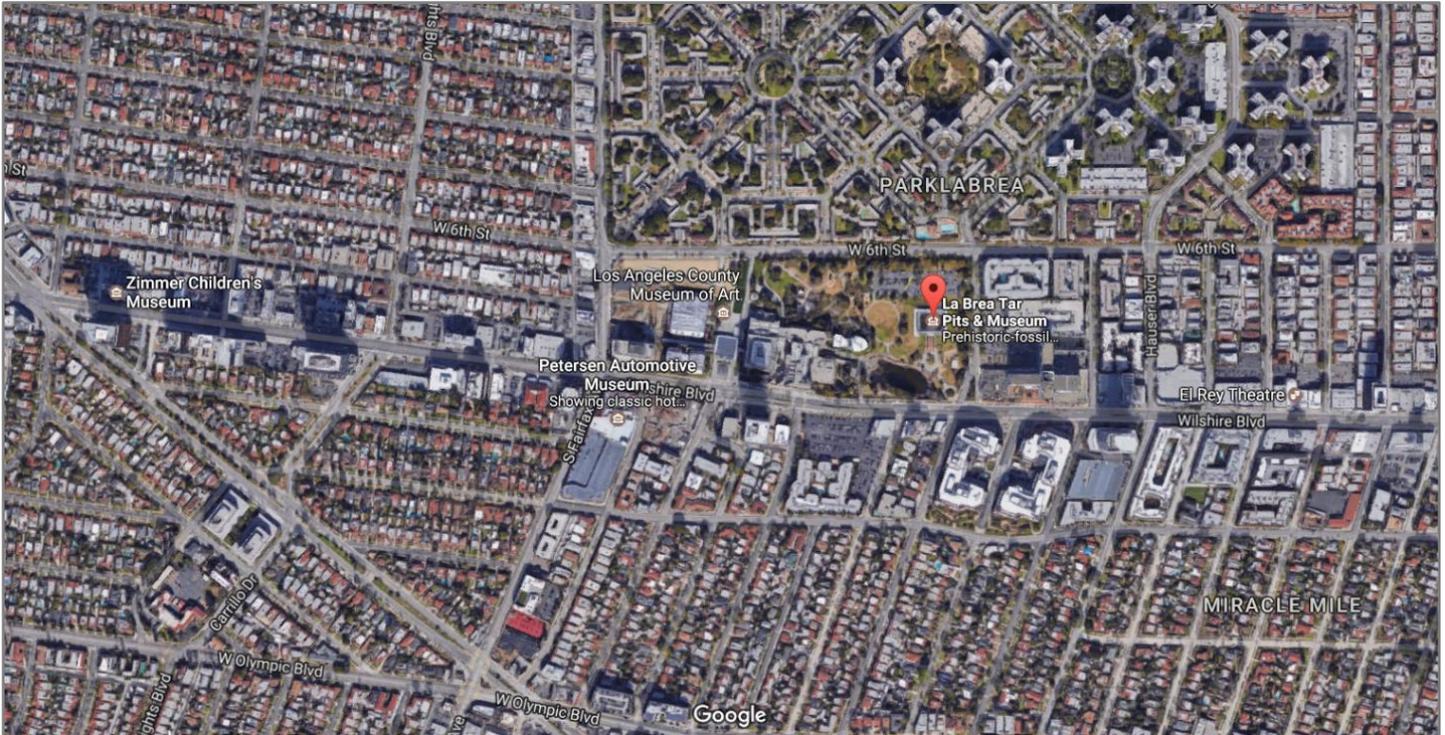
In fact, the Le Brea Tar Pits (which are actually naturally occurring bitumen asphalts and not tar) are famous for the stink they produce in Los Angeles, CA. However, every year it is a popular attraction for tourists, school field trips and the like.

Risk of death for selected causes	
Cause of death	Risk per million
Occupational (45 years)	
Agriculture	9,765
Construction	4,095
Manufacturing	810
Leisure and hospitality	450
Financial services	225
Lifetime risks (78 years)	
Air pollution (U.S. average) cancer risk	19,700
Choking	1,181
Indoor air pollution (Southern California) cancer risk	607
Electricity	80
Being hit by a meteorite	32
Lightning strike	6
One chest X-ray	4
Two 8-ounce charcoal-broiled steaks per year	1
Highest estimate of lung cancer risk from daily full-shift exposure to roofing asphalt fumes for a 45-year work-life	8

Notice these interesting comments from the LA Times:

La Brea tar pits celebrate a century of stink, ooze and amazement

The La Brea tar pits are marking 100 years of digging history out of the muck. The aroma of the pits is notorious along Los Angeles' Miracle Mile, where they have been burbling since prehistoric times. It's an incredible site that has fascinated scientists for more than a century — Those who have visited or live near the pits know the place by its smell — which can approach a freshly tarred road on a hot summer day [9]



Thousands of people live and work in close proximity to the Le Brea Tar Pits despite the asphalt odor.

Q - How long will the smell last? Is there any danger of emissions after the work is complete?

Please notice these comments from the document “Some Questions and Answers About Short-Term Non-Occupational Exposures to Asphalt Fumes Created During Roofing Jobs” produced by ARMA:

It is important to recognize that many asphalt roofing products, including shingles and roll goods as well as roof coatings, mastics and cements, are not heated during application and therefore do not release asphalt fumes. In addition, products that are heated during application, such as built-up roofing systems, stop releasing fumes after the material has cooled, which is typically within one hour.

[7]

A quick look around your own neighborhood will quickly reveal how much asphalt we interact with on a daily basis without problems. Most of our roads,

the majority of our home’s roofs and many other products we use daily are asphalt based.

Q - If I am sensitive to the smell of asphalt what can I do?

Here are some practical steps outlined in the document “Some Questions And Answers About Short-Term Non-Occupational Exposures To Asphalt Fumes Created During Roofing Jobs” produced by ARMA:

Because of the diluting effects of distance and air currents, the exposure to building occupants near a roofing job would in most cases be many times lower than that of roofing workers, though an odor may on occasion be present.

Although building occupant exposure is likely to be very low, the asphalt roofing industry supports several common-sense precautions to further minimize fume exposure, including these:

Air intakes and windows that are downwind from where the asphalt is being heated and applied

should be closed if practicable. The roofing kettle should be placed downwind of occupied buildings whenever possible. Further, building occupants (workers, students, etc.) should be told about the re-roofing job, informed that they may notice a petroleum-type odor as the work is performed, and provided with the latest available information on health effects. In addition, several of the recommended practices for controlling worker exposures will also reduce potential exposures to building occupants. These practices include the use of low-fuming asphalts, kettle emission and temperature controls, and work practices that prevent the unnecessary release of fumes and keep kettle temperatures as low as possible consistent with the maintenance of recommended asphalt application temperatures.

[7]

References:

- [1]
http://www.wbdg.org/FFC/DOD/UFC/ufc_3_110_03_2012_c2.pdf
- [2]
<http://www.ricowi.com/reports>

- [3]
<https://en.wikipedia.org/wiki/Asphalt>
- [4]
<https://en.wikipedia.org/wiki/Asphalt>
- [5]
<http://www.usatoday.com/story/money/business/2013/06/16/toxic-driveways-cities-states-ban-coal-tar-pavement-sealants/2028661/>
- [6]
<http://www.dictionaryofconstruction.com/definition/oxidized-asphalt.html>
- [7]
http://www.nrca.net/consumer/arma_asphalt.pdf
- [8]
<http://www.professionalroofing.net/Articles/New-findings-are-in--02-01-2016/3781>
- [9]
<http://articles.latimes.com/2013/oct/28/science/la-sci-la-brea-tar-pits-100-years-20131028>

This update sheet is intended to provide a general informational resource for building occupants and others in the vicinity of roofing jobs involving the use of hot asphalt. It is based on information that is published in open literature or otherwise readily available to the general public and believed to be reliable. Although every reasonable effort has been made to be accurate as of the publication date, we cannot accept responsibility for any inaccuracies or omissions this brochure may contain. We are not engaged in the rendering of legal or medical advice or services. If expert assistance is required, the services of a competent professional should be sought. This brochure does not set forth the regulations and guidelines applicable to roofers exposed to asphalt fumes on the job. A number of informational resources for workers developed by Government and Industry organizations may be obtained by contacting ARMA or NRCA.