ROOFING BITUMEN "Probably Carcinogenic," Says IARC

By Dan Adley, CIH, CSP

On October 18, 2011, a Working Group of the World Health Organization (WHO) International Agency for Research on Cancer (IARC) drew a distinction among certain forms of bitumen, classifying occupational exposures to oxidized bitumen, such as those found in roofing asphalt, as "probably carcinogenic to humans" (Group 2A). In addition, IARC classified exposures to hard bitumen and "straight-run" bitumen as "possibly carcinogenic," or Group 2B.

OCCUPATIONAL EXPOSURES TO BITUMENS AND THEIR EMISSIONS

Under the IARC Monographs program, a working group reevaluated various occupations that involve exposures to bitumens and bitumen emissions, including road paving, roofing, and application of mastic asphalt. The Working Group concluded that:

- Occupational exposures to oxidized bitumens and their emissions during roofing are "probably carcinogenic to humans" (Group 2A);
- Occupational exposures to hard bitumens and their emissions during mastic asphalt work are "possibly carcinogenic to humans" (Group 2B); and
- Occupational exposures to straight-run bitumens and their emissions during road paving are "possibly carcinogenic to humans" (Group 2B).

WHAT DO THESE CLASSIFICATIONS MEAN?

The IARC monographs identify environmental factors that can increase the risk of human cancer. National health agencies around the world use this information as scientific support for their actions to prevent exposure to potential carcinogens. Working groups of scientists review published studies and evaluate the weight of the evidence that an agent can increase the risk of cancer. IARC defines four overall Groups, from "agents that are carcinogenic to humans" (Group 1) to "agents that are probably not carcinogenic to humans" (Group 4). This latest announcement involves two subcategories within Group 2.

Group 2 includes agents for which, at one extreme, the degree of evidence of carcinogenicity in humans is present but limited, and therefore assigned to "probably carcinogenic to humans" (Group 2A). This category is generally used when there is

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limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals.

At the other extreme of Group 2, there may be no human data, but there is evidence of carcinogenicity in experimental animals. The agent is assigned to "possibly carcinogenic to humans" (Group 2B). This category is used for agents for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence of such in experimental animals. It may also be used when there is inadequate evidence of carcinogenicity in humans but there is sufficient evidence of it in experimental animals.

The terms "probably carcinogenic" and "possibly carcinogenic" have no quantitative significance and are used simply as descriptors of different levels of evidence of human carcinogenicity, with "probably carcinogenic" signifying a higher level of evidence than "possibly carcinogenic."

BACKGROUND ON IARC'S RECENT ANNOUNCEMENT

Bitumens are produced by distillation of crude oil during petroleum refining and also occur naturally. Bitumens can be divided into broad classes according to their physical properties and specifications required for different uses. The main use of bitumens is in asphalt for road paving, as well as roofing, waterproofing and sealing, and painting. Application of bitumens may generate airborne emissions.

Bitumen was reviewed by previous IARC Monographs working groups in 1985 and in 1987. At the time, studies on exposed workers were few, and their results were difficult to interpret because of concurrent exposure to coal tar, a known cancer-causing compound, and other exposures (e.g., diesel engine exhaust, silica, etc.). Different types of extracts, fume condensates, and pooled mixtures of bitumens had been tested in experimental animals, and there was sufficient evidence for the carcinogenicity of some of them.

KEY ADDITIONAL STUDIES

A number of additional epidemiological studies were now available to the IARC working group, including a compilation of 20 studies published up until 1994, a number of additional individual studies, and IARC's own cohort study. In addition, a large number of studies in exposed workers, animals, and cellular experimental systems have become available.

CONCLUSIONS OF THE IARC WORKING GROUP

The primary conclusion of the IARC working group of relevance to RCI relates to occupational exposures to oxidized bitumens and their emissions during roofing. The working group concluded that the body of available data from cancer studies in humans points to an association between exposure to oxidized bitumens during roofing and lung cancer and tumors in the upper respiratory/digestive tract. In support of these findings, extracts and fume condensates of oxidized bitumens, which are used primarily in roofing applications, showed sufficient evidence of carcinogenicity in experimental animals. Taking these data together, the working group classified occupational exposures to oxidized bitumens and their emissions during roofing as "probably carcinogenic to humans" (Group 2A).

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The working group also concluded that there was limited evidence in humans for the carcinogenicity of occupational exposures during mastic asphalt work, based on two positive studies among mastic asphalt workers. These types of "hard" bitumens have not been tested in experimental animals. As a result, occupational exposures to hard bitumens and their emissions during mastic asphalt work were classified as "possibly carcinogenic to humans" (Group 2B).

Similarly, the working group concluded that there was inadequate evidence in humans or experimental animals for the carcinogenicity of occupational exposures during road paving with "straight-run" bitumens. However, studies of workers exposed to bitumen emissions during paving with straight-run bitumens showed mutagenic and genotoxic effects (DNA/reproductive) in these workers. This evidence led to the classification of occupational exposures to straight-run bitumens and their emissions during road paving as "possibly carcinogenic to humans" (Group 2B).

REGULATORY IMPACT

IARC has no regulatory authority within the United States. However, under OSHA's Hazard Communication Standard (29 CFR 1910.1200), manufacturers and importers of hazardous substances are required to evaluate products they introduce into the workplace. This hazard determination must consider the carcinogenicity of chemicals. OSHA has indicated that any listing in the latest edition of the IARC Monographs establishes carcinogenic or potential carcinogenic risk for hazard communication purposes. For manufacturers, this may trigger certain changes in reporting on items like Material Safety Data Sheets and product labels. For employers, it may trigger modifications to written hazard communication and training programs. While not required by the Hazard Communication standard, this change may also trigger worker exposure monitoring requirements as part of OSHA's Respiratory Protection standard. RCI members should fully consider the ramification of this new IARC listing.

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ICC Approves Green Model Code

On November 6, the International Code Council (ICC) approved the nation' s first green model code for new and existing commercial buildings. The 2012 International Green Construction Code (IgCC) provides model language for municipalities to use in developing regulations related to energy conservation, water efficiency, building waste, and materials. The new code, however, does not allow an " outcome-based" path that would have allowed builders to comply with the code by demonstrating actual energy performance once buildings are operational. This was an option that would have allowed designers more flexibility in meeting green codes, some claim.

— ENR

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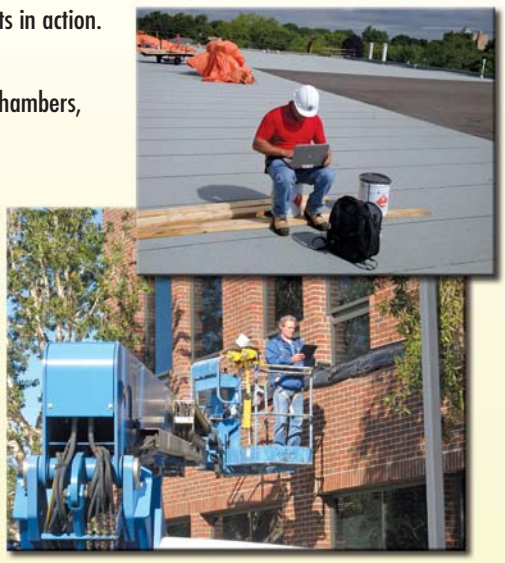

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