Artificial Turf Fact Sheet Temporary Addendum.

Chrysene, a PAH and carcinogen, was found to be ingested as the result of hand-to-surface-to-mouth transfer from playground surfaces made with recycled tires. Assuming playground use for an 11 year period (from age 1 to 12) there was found to be an increased cancer risk of 2.9 in one million (2.9×10^{-6}). This risk is greater than the general cancer risk gauge of one in one million (1×10^{-6}).[1] This research would seem to suggest that repeat exposure over time to the chemicals released from artificial turf increases the associated increase in cancer risk.

Only 31% of the playground surfaces made of recycled tires tested in one research study passed the California State mandated Head Impact Criterion (HIC) of $\leq$1,000. In this same study 100% of the playground surfaces made of wood chips passed the same standard.[2]

When talking about the use of ground rubber as a supplement to planting soils the North Carolina Department of Agriculture and Consumer Services sent out a notice identifying the risk that zinc leaching from the rubber causes a decline in plant growth "directly attributable to zinc toxicity."[3]

A Case Study conducted by a group of "physicians and public health professionals working with the U.S. Environmental Protection Agency's Region Pediatric Environmental Health Specialty Unit" found that they could not secure the research and information necessary to establish the safety in use with

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[1] Office of Environmental Health Hazard Assessment, Evaluation of Health Effects of Recycled Waste Tires in Playground and Track Products, January 2007. Note -- the 1.2 in 10 million cancer risk found in the OEHHA study was considered by the authors to be an acceptable level of risk as it falls below the general cancer risk gauge of one in one million (1×10^{-6}).

[2] Office of Environmental Health Hazard Assessment, Evaluation of Health Effects of Recycled Waste Tires in Playground and Track Products, January 2007. Please note that in this study 32 recycled tire playground surfaces were tested as compared to only 5 wood chip playground surfaces.

[3] M. Ray Tucker, Agronomist, Ground Rubber: Potential Toxicity to Plants, Media Notes for North Carolina Growers, North Carolina Dept of Agriculture & Consumer Services, April 1997.

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children of tire crumb used as playground surface.[4] "The use of recycled tire crumb products on playgrounds has had little health investigation. The major unresolved concern is the potential for latex allergy with short-term dermal exposure." [5] "No published information is available specifically regarding exposure to crumb rubber constituents from use of the product on playgrounds." [6]

Analyses conducted at the Environmental and Occupational Health Sciences Institute of Rutgers University found the crumb rubber from artificial turf to contain high levels of PAHs, as well as zinc and arsenic.[7] PAHs found to be contained in the crumb rubber "were above the concentration levels that the New York State Department of Environmental Conservation (DEC) considers sufficiently hazardous to public health to require their removal from contaminated soil sites. It is highly likely that all six PAHs are carcinogenic to humans." [8] "The analyses also revealed levels of zinc in both samples that exceed the DEC's tolerable levels." [9] The researchers associated with these findings were careful to state "We want to emphasize that the findings are preliminary. PAHs in rubber might not act the same way as in soil, and we do not yet have information on the ease with which the PAHs in these rubber particles might be absorbed by children or adults -- by ingestion, inhalation, or absorption through the skin. However, the findings are worrisome. Until more is known, it wouldn't be prudent to install the synthetic turf in any more parks." [10]

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[4] M.E. Anderson et al, A Case Study of tire Crumb Use on Playgrounds: Risk Analysis and Communication When Major Clinical Knowledge Gaps Exist, Environmental Health Perspectives, Vol 114, No. 1, January 2006.
[5] M.E. Anderson et al, A Case Study of tire Crumb Use on Playgrounds: Risk Analysis and Communication When Major Clinical Knowledge Gaps Exist, Environmental Health Perspectives, Vol 114, No. 1, January 2006.
[6] M.E. Anderson et al, A Case Study of tire Crumb Use on Playgrounds: Risk Analysis and Communication When Major Clinical Knowledge Gaps Exist, Environmental Health Perspectives, Vol 114, No. 1, January 2006.
[7] Junfeng Zhang, professor and acting chair, Department of Environmental and Occupational Health, the School of Public Health, the University of Medicine and Dentistry of New Jersey and Rutgers University & William Crain, professor of psychology at The City College of New York, president of Citizens for a Green Riverside Park, Hazardous Chemicals in Synthetic Turf, 2006, analyses conducted at at the Environmental and Occupational Health Sciences Institute of Rutgers.
[8] Junfeng Zhang, professor and acting chair, Department of Environmental and Occupational Health, the School of Public Health, the University of Medicine and Dentistry of New Jersey and Rutgers University & William Crain, professor of psychology at The City College of New York, president of Citizens for a Green Riverside Park, Hazardous Chemicals in Synthetic Turf, 2006, analyses conducted at at the Environmental and Occupational Health Sciences Institute of Rutgers.
[9] Junfeng Zhang, professor and acting chair, Department of Environmental and Occupational Health, the School of Public Health, the University of Medicine and Dentistry of New Jersey and Rutgers University & William Crain, professor of psychology at The City College of New York, president of Citizens for a Green Riverside Park, Hazardous Chemicals in Synthetic Turf, 2006, analyses conducted at at the Environmental and Occupational Health Sciences Institute of Rutgers.
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Connecticut is currently considering legislation to provide $250,000 of funding for a study into the toxicity of artificial turf athletic fields.[11]

One Norwegian assessment/presentationconcluded that while indoor artificial turf fields were not generally an elevated health risk, studies to date could not eliminate the concerns associated with development of airway allergies and made a point of noting "a link between exposure to phthalates and the development of asthma/allergies". [12] Phthalates is one of the contaminants of concern found in artificial turf crumb rubber. [13]

The Norwegian assessment/presentation also reported that "recycled rubber was the major source of potentially hazardous substances. An exposure scenario where the runoff from a football field is drained to a small creek showed a positive risk of toxic effects on biota in the water phase and in the sediment. The risk was mainly attributed to zinc, but also for octylphenol the predicted environmental concentrations exceeded the no environmental effect concentration." [14] The hazardous leaching could result in local environmental effect.[15]

Of interest – William Carin, OpEd, NY Times, ***Turf Wars***, September 16, 2007.

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[11] *An Act Concerning a Study of the Toxicity of Artificial Turf Athletic Fields*, Raised Bill No. 361, February Session 2008.

[12] Dr. Christine Bjorge, Norwegian Institute of Public Health, Artificial turf Pitches – an assessment of the health risks for football players and the environment, Presentation at the ISSS Technical meeting 2006, Dresden.

[13] KEM, Swedish Chemicals Agency, Facts: Synthetic Turf, April 2007.

[14] Dr. Christine Bjorge, Norwegian Institute of Public Health, Artificial turf Pitches – an assessment of the health risks for football players and the environment, Presentation at the ISSS Technical meeting 2006, Dresden.

[15] Dr. Christine Bjorge, Norwegian Institute of Public Health, Artificial turf Pitches – an assessment of the health risks for football players and the environment, Presentation at the ISSS Technical meeting 2006, Dresden.