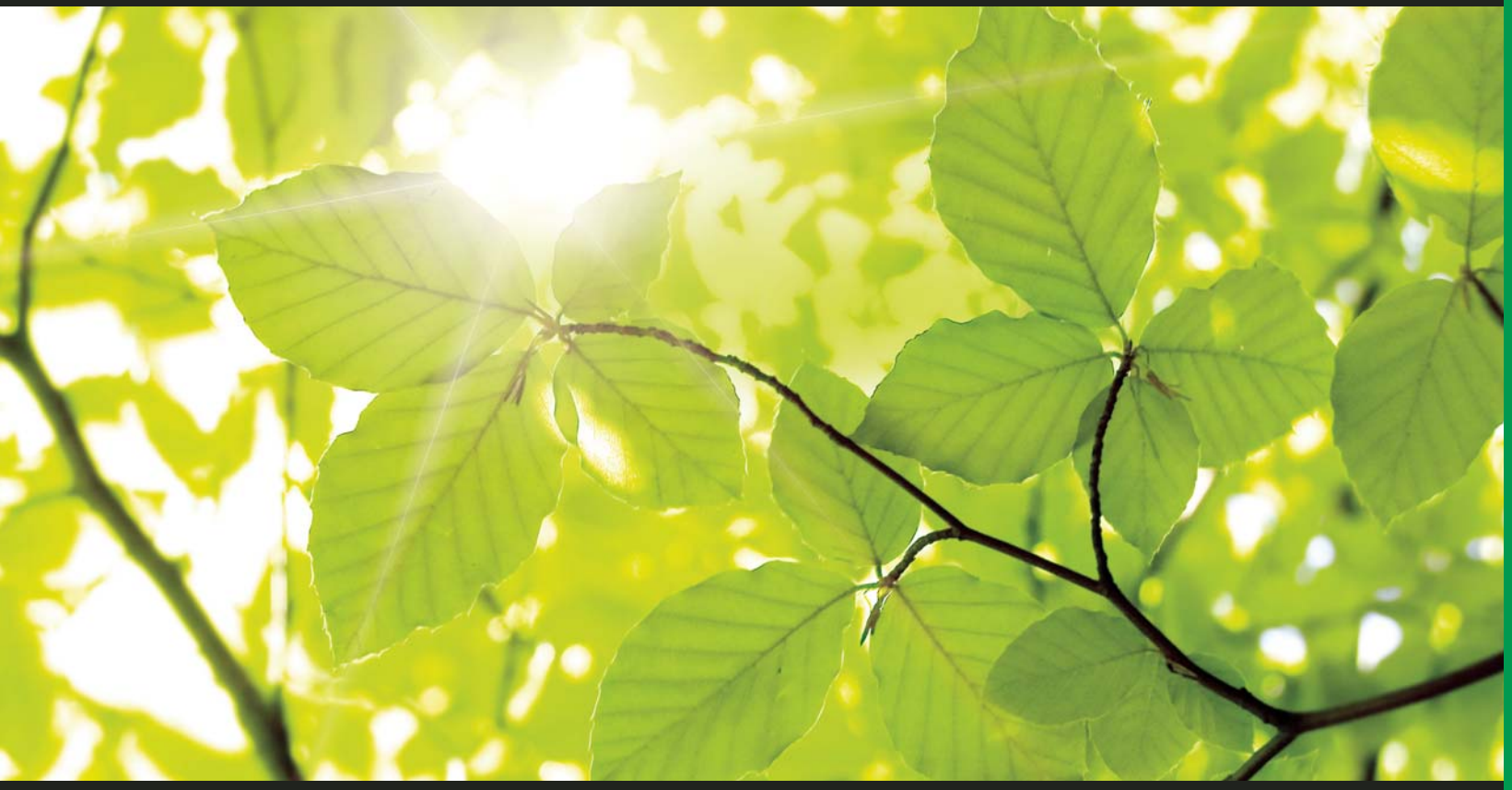
Environmental Studies



PINNACLE
Rubber Mulch

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TIRE RECYCLING

IPEMA Environmental Statement

FOR IMMMEDIATE RELEASE

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Association Releases Information Regarding Use of Recycled Rubber on Playgrounds

HARRISBURG - Recently, media reports have raised questions about the use of recycled rubber on playgrounds. As a leader of the play equipment and related materials industry, the International Play Equipment Manufacturers Association (IPEMA) investigated various studies and reports related to this issue. The investigations revealed the following facts:

The Environmental Protection Agency (EPA) recently studied air and surface samples at four fields and playgrounds that use recycled tires – the same material that cushions the ground under the Obama family's new play set at the White House. The limited study, conducted in August through October 2008, found that the concentrations of materials that made up tire crumb were below levels considered harmful. In addition, the overall study protocol and many of the methods were found to be appropriate and could be implemented in the field.
(The details of the EPA's study can be found at http://www.epa.gov/nerl/features/tire_crumbs.html)

The Office of Environmental Health Hazard Assessment of the California Environmental Protection Agency tested skin sensitization by playground surfaces made of recycled tires and found no sensitization observed suggesting that these surfaces would not cause skin sensitization in children, nor would they be expected to elicit skin reaction in children already sensitized to latex.
(Study dated January 2007 can be viewed at: www.ciwmb.ca.gov/Publications/Tires/62206013.pdf)

ChemRisk, Inc. in Pittsburgh conducted a review of exposure to recycled tire rubber found on playgrounds and synthetic turf fields. They concluded that no adverse human health or ecological health effects are likely to result from these beneficial reuses of tire materials.
(Study dated July 17, 2008. Detailed information and more studies can be found at http://www.syntheticturfcouncil.org/displaycommon.cfm?an=1&subarticlenbr=91)

(more)

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A comprehensive review of the available literature on the potential health effects of crumb rubber infill from synthetic turf fields was conducted by TRC on behalf of the New York City Department of Health and Mental Hygiene. This review demonstrated that the major health concern of these fields is related to heat. Eleven different risk assessments applied various available concentrations of COPCs and none identified an increased risk for human health effects as a result of ingestion, dermal or inhalation exposure to crumb rubber.
(Study dated May 2008 can be reviewed by visiting
www.nyc.gov/html/doh/downloads/pdf/eode/turf_report_05-08.pdf)

IPEMA does not dictate or recommend whether its members use recycled rubber in their products. It is the choice of the individual member. The U.S. Consumer Product Safety Commission (CPSC) determines and guides the safety issues facing the playground equipment industry. Additionally, the Environmental Protection Agency (EPA) has endorsed the use of recycled rubber to cushion the surfaces of children's playgrounds. For more information, visit http://www.epa.gov/osw/conserve/tools/cpg/products/playgrnd.htm.

IPEMA encourages its members to follow the guidelines of the CPSC. IPEMA will respond appropriately if the CPSC or EPA identifies recycled tire rubber as a play hazard. The CPSC, the Centers for Disease Control and the EPA recommend that young children wash their hands frequently after playing outside and always before they eat. IPEMA also recommends these practices. IPEMA is always interested in reviewing new safety information, including any independent, third party, scientific studies concerning the use of recycled tires. IPEMA will be monitoring the EPA 2010 meeting with federal and state agencies that will review all new study data and determine next steps.

IPEMA provides a voluntary third-party product certification to ASTM safety standards in the U.S. and Canada for playground products, including surfacing materials. Those interested in learning more about play equipment and surfacing safety are encouraged to visit www.ipema.org.

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TIRE RECYCLING

Crumb Rubber Impact Studies

1994 – 2009

Table of Contents

1.0 Introduction

This document provides a comprehensive collection of crumb rubber health and environmental impact studies conducted between 1994 and 2008 and cross-references such research to the related issues in question, including:

- Lead
- Off-gassing
- Toxicity
- Zinc, Heavy Metals and Runoff
- Ingestion
- Staph Infection (Staphylococcus aureus)
- Allergies/Latex
- Additional concerns ranging from crumb rubber use in construction materials to flammability and playground injuries

The fifty-two studies and reports referenced have been obtained from government organizations, academic institutions, NGOs and non-profit organizations worldwide and focus primarily on the application of recycled tire rubber in playground surfaces and athletic fields.

This reference is meant to facilitate a thorough and objective examination of environmental and human health concerns related to the use of recycled rubber in surfacing materials.

2.0 Lead

Lead does not occur in native tire tread by composition, but may become entrained in the tread upon contact with the road surface and thus be detectable in recycled rubber surfaces. A 2007 report from the Office of Environmental Health Hazard Assessment (OEHHA) examined the effects of lead in crumb rubber surfaces for increased cancer risk in humans and found no indication of an elevated health hazard.

Additionally, risk of groundwater contamination through lead runoff from a shredded tire embankment was addressed in a 10-year Virginia Field Study. Lead levels were found to be 9 parts per billion or less, well below the Maximum Contaminant Level (MCL) of 15 parts per billion. A 2008 report by the engineering firm Milone & MacBroom confirmed that the levels of heavy metals found in runoff from turf fields are comparable to those expected to leach from native soil.

Lead concentrations in artificial turf leachate analyzed in a 2004 study in Norway found levels below the normative values established by the Norwegian Pollution Control Authority, wherefore no elevated risk to human health or the ecosystem were concluded. The findings pertaining to human health were confirmed in a 2008 study by the Consumer Product Safety Commission, which tested specifically for risk to children in contact with artificial turf blades and consequent ingestion of lead.

Evaluation of Health Effects of Recycled Waste Tires in Playground and Track Products	CIWMB, OEHHA, 2007	Full Text
Field Study of Shredded Tire Embankment	Virginia Department of Transportation, 2004	Full Text
Evaluation of the Environmental Effects of Synthetic Turf Athletic Fields	Milone & MacBroom, Engineering firm, 2008, S.G. Bristol, V.C. McDermott	Full Text
Potential Health and Environmental Effects Linked to Artificial Turf Systems	Norwegian Building Research Institute, 2004, T.S.W. Plesser, O.J. Lund	Full Text
Review of the Human Health and Ecological Safety of Exposure to Recycled Tire Rubber found at Playgrounds and Synthetic Turf Fields	Rubber Manufacturers Association, 2008, ChemRisk, Inc Pittsburgh PA	Full Text
Synthetic Playfields Task Force Findings and Department Recommendations Report to San Francisco Recreation and Parks	San Francisco Recreation and Park Department, 2008	Full Text
A Study to Assess Environmental Impacts from the Use of Crumb Rubber as Infill Material in	NYS Department of Environmental Conservation, 2008	Full Text

Synthetic Turf Fields		
CPSC Staff Analysis and Assessment of Artificial Turf Blades	Consumer Product Safety Commission (CPSC), 2008	Full Text
The Leaching of Inorganic Species from Activated Carbons Produced from Waste Tyre Rubber	Water Research, Vol 36, Issue 8, April 2002, pgs 1939-1946, San Miguel, G., Fowler, G.D., Sollars, C.J.	REF048.pdf
Potential Exposure to Lead in Artificial Turf: Public Health Issues, Actions and Recommendations	U.S. Centers for Disease Control and Prevention, 2008	Full Text

3.0 Off-Gassing

Off-gassing of volatile organic compounds (VOCs) from rubber infill in outdoor locations is expected to be greatest in high temperatures. Temperature gradients and wind in such installations have shown to dilute gases quickly and leave low concentrations of VOCs in the breathing zone. A 2008 report by the engineering firm Milone & McBroom also analyzed VOC levels in the breathing zone of outdoor turf fields, particularly volatile nitrosamine, benzothiazole and 4-(tert-octyl) phenol and found no detectable concentrations of the first and latter and low concentrations of benzothiazole directly above one of two fields that had recently been groomed. A 2007 field turf study conducted by the French government (EEDEMS) found that off-gassing of VOCs and aldehydes did not pose a health concern to the general public, athletes or outdoor installers.

In contrast, a limited 2005 study of an indoor hall with recently laid rubber granules suggests higher-than-normal levels of total VOCs, but due to a number of variables, the authors suggest further research. A 2006 study conducted in Oslo, Norway, found no evidence linking total VOCs released from indoor recycled rubber surfaces to adverse effects on human health. However, due to information gaps, individual substances identified as part of the VOC fraction could not be conclusively assessed for potential health effects. A 2007 study conducted by the Office of Environmental Health Hazard Assessment in California also found no elevated cancer risk following in-depth analysis of VOCs. The 2007 EEDEMS report mentioned above raised

concerns about health effects on the crews installing crumb rubber athletic fields in poorly ventilated indoor areas and recommends a minimum air renewal rate of 2 $vol.h^{-1}$. A 2006 study conducted in Norway drew a similar conclusion, stating that, while no evidence of health risks from the internal use of recycled rubber surfaces could be determined, proper ventilation is always recommended. These recent findings are consistent with those of a 1999 Taiwanese study that identified temperature and age of the recycled rubber material as the primary factors in VOC emission rates.

Fact Sheet: Artificial Turf Fields: Health Questions	CT Department of Public Health, 2007	Full Text
Artificial Turf Pitches – An Assessment of the Health Risks for Football Players	Norwegian Institute of Public Health and the Radum Hospital, 2006	Full Text
Evaluation of Health Effects of Recycled Waste Tires in Playground and Track Products	CIWMB, OEHHA, 2007	Full Text
Examination of Crumb Rubber Produced from Recycled Tires	The Connecticut Agricultural Experiment Station, 2007	Full Text
Exposures to Recycled Tire Rubber Crumbs Used on Synthetic Turf Fields, Playgrounds and as Gardening Mulch	Environment & Human Health, Inc (non-profit organization), 2007	Full Text
Measurement of Air Pollution in Indoor Artificial Turf Halls	Norwegian Pollution Control Authority, 2005	Full Text

Evaluation of the Environmental Effects of Synthetic Turf Athletic Fields	Milone & MacBroom, Engineering firm, 2008, S.G. Bristol, V.C. McDermott	Full Text
Environmental and Health Assessment of the use of Elastomer Granulates (Virgin and from Used Tyres) as Filling in Third-Generation Artificial Turf	FieldTurf Tarkett, Aliapur, EEDEMS, ADEME, 2007, R. Moretto	Full Text
Preliminary Assessment of the Toxicity from Exposure to Crumb Rubber: Its use in Playgrounds and Artificial Turf Playing Fields	NJ Department of Environmental Protection, 2007, T. Ledoux	Full Text
Review of the Human Health and Ecological Safety of Exposure to Recycled Tire Rubber found at Playgrounds and Synthetic Turf Fields	Rubber Manufacturers Association, 2008, ChemRisk, Inc Pittsburgh PA	Full Text
Synthetic Turf From A Chemical Perspective	Swedish Chemicals Inspectorate, 2006	Full Text
A Study to Assess Environmental Impacts from the Use of Crumb Rubber as Infill Material in Synthetic Turf Fields	NYS Department of Environmental Conservation, 2008	Full Text
Emission Characteristics of VOCs from Athletic Track	Journal of Hazardous Materials, 1999, Volume 70, Issues 1-2, Chag, Feng-Hsiang	REF045.pdf

4.0 TOXICITY

This section will include studies pertaining to ecotoxicological issues, concerns regarding carcinogens, mutagens, endocrine disruptors and other substances known for their adverse effects on human health. The examination of indoor air where recycled rubber surfaces were present by the Norwegian Institute of Public Health determined that the presence of benzene and polycyclic aromatic hydrocarbons (PAHs) does not increase the risk of cancer in individuals exposed to it. These findings agree with a 2007 report from the Office of Environmental Health Hazard Assessment (OEHHA), which analyzed the absorption of aluminum, arsenic, barium, cadmium, cobalt, chromium, iron, lead, manganese, mercury, nickel, selenium and zinc traces in crumb rubber and concluded that serious non-cancer health effects are not expected following a one-time ingestion of the material. The study further concluded very low environmental toxicity from surface runoff upon examining the soil and groundwater adjacent to crumb rubber surfaces, pointing out that previous studies produced the leachate in a laboratory setting, wherefore it may have been more concentrated than naturally occurring runoff, although various laboratory studies, such as the 1999 experiment performed by the Chelsea Center, also agreed that drinking water quality would not be compromised by recycled rubber chip applications.

A 2004 study in Norway found the total concentration of lead, cadmium, copper and mercury in recycled rubber granulates to be below the Norwegian Pollution Control Authority's normative values for most sensitive land use and concluded that it is not probable to constitute an unacceptable environmental risk in the short or the long term.

Artificial Turf Pitches – An Assessment of the Health Risks for Football Players	Norwegian Institute of Public Health and the Radum Hospital, 2006	Full Text
Exposures to Recycled Tire Rubber Crumbs Used on Synthetic Turf Fields, Playgrounds and as Gardening Mulch	Environment & Human Health, Inc (non-profit organization), 2007	Full Text
Evaluation of Health Effects of Recycled Waste Tires in Playground and Track Products	CIWMB, OEHHA, 2007	Full Text

Fact Sheet: Crumb-Rubber Infilled Synthetic Turf Athletic Fields	NYS Department of Health, 2008	Full Text
Potential Health and Environmental Effects Linked to Artificial Turf Systems	Norwegian Building Research Institute, 2004, T.S.W. Plesser, O.J. Lund	Full Text
Preliminary Assessment of the Toxicity from Exposure to Crumb Rubber: Its use in Playgrounds and Artificial Turf Playing Fields	NJ Department of Environmental Protection, 2007, T. Ledoux	Full Text
Review of the Human Health and Ecological Safety of Exposure to Recycled Tire Rubber found at Playgrounds and Synthetic Turf Fields	Rubber Manufacturers Association, 2008, ChemRisk, Inc Pittsburgh PA	Full Text
Synthetic Playfields Task Force Findings and Department Recommendations Report to San Francisco Recreation and Parks	San Francisco Recreation and Park Department, 2008	Full Text
Preliminary Investigation of Tire Shreds for Use in Residential Subsurface Leaching Field Systems	Chelsea Center for Recycling and Economic Development Plastics Conversion Project, 1999	Full Text
Toxicological Evaluation for the Hazard Assessment of Tire Crumb for Use in Public Playgrounds	Journal of the Air & Waste Management Association, 2003, Birkholz, D.A., Belton, K.L., Guidotti, T.L.	Full Text
A Review of the Potential Health and Safety Risks from Synthetic Turf Fields Containing Rubber Infill	NYC Department of Health and Mental Hygiene, 2008, Denly, E., Rutkowsky, K., Vetrano, K.	Full Text

5.0 Zinc, Heavy Metals and Runoff

An extensive study conducted in the Netherlands determined that the zinc content of recycled tire surfaces in athletic fields poses no risk to public health, as human toxicity of zinc is low and levels detected in drinking water conform to the standards of the World Health Organization (WHO). Ecotoxicological effects were of concern, however, specifically the accumulation of zinc in groundwater and soil through runoff from aging crumb rubber. These findings confirmed a 2005 report by the Norwegian Institute for Water Research, which concluded "that the concentration of zinc poses a significant local risk of environmental effects in surface water which receives run-off from artificial turf pitches. In addition, it is predicted that concentrations of alkylphenols and octylphenol in particular exceed the limits for environmental effects in the scenario which was used (dilution of run-off by a factor of ten in a recipient). The leaching of chemicals from the materials in the artificial turf system is expected to decrease only slowly, so that environmental effects could occur over many years. The total quantities of pollution components which are leached out into water from a normal artificial turf pitch are however relatively small, so that only local effects can be anticipated." (NIVA, 2005) Zinc concentrations in artificial turf leachate analyzed in a 2004 study in Norway furthermore found levels above the normative values established by the Norwegian Pollution Control Authority. It also determined that the content of potentially harmful substances can vary significantly by manufacturer and suggested the enforcement of uniform guidelines to improve recycled rubber quality across the industry.

An extensive study conducted by the California Integrated Waste Management Board (CIWMB) and the Office of Environmental Health Hazard Assessment in 2007 further analyzed zinc ingestion and found no elevated health risk, even in small children, aside from gastrointestinal discomfort. The study also analyzed groundwater and soil surrounding artificial turf areas and concluded a very low risk of environmental impact, pointing out that previous studies, such as the Norwegian 2004 report mentioned above, produced the leachate in a laboratory setting, wherefore it may have been more concentrated than naturally occurring runoff.

Groundwater contamination risk was furthermore addressed in a 10-year Virginia Field Study for the use of ground tires in an embankment. Zinc levels were found to be 0.13 parts per billion, far below the Secondary Maximum Contaminant Level (SMCL) of 5 parts per million. A 5-year groundwater study from the University of Maine and the University of Texas agrees with these findings, stating that tire shreds placed below the groundwater level have negligible off-site effects on water quality. The 2007 report by Dr. Robert Moretto on the short and medium-term effects of artificial turf on groundwater concurs with this assessment. The most recent field study available on leaching of zinc was conducted over a seven year period in the Netherlands and evaluated five artificial turf fields. Researchers concluded that the concentration of zinc in drainage is comparable to the zinc concentration in rain and poses no added health risks. The study did point out that leaching would probably occur 230-1800 years after installation.

Tires stockpiled in landfills present a significant hazard to the ecosystem. They degrade slowly, contribute to fires that release combustion products, including volatile organic hydrocarbons and dioxins, and leach into the water supply as they decompose. Runoff from playground surfaces and athletic fields has shown toxicity in examined aquatic organisms for the first three months after installation. After the aging period of the surface product, this activity ceased. A 2006 study conducted in Norway examined the environmental impact from runoff and found the associated risk to be small and local and depending on factors including soil composition and regional sensitivity, as well as particle size, pH value and the age of the rubber material. The Swedish Chemicals Inspectorate consequently recommended additional research and the phasing out of potentially hazardous materials from the tire production process.

A case study of Tire Crumb use on Playgrounds: Risk Analysis and Communication When Major Clinical Knowledge Gaps Exist	Environmental Health Perspectives Jan 2006, Vol 114 Issue 1, p1 3p, M.E. Anderson, K.H. Kirkland, T.L. Guidotti, C. Roase	Full Text
Leaching of Zinc from Rubber Infill on Artificial Turf	Laboratory for Ecological Risk Assessment (RIVM), 2007, A.J. Verschoor	Full Text
Environmental Risk Assessment of Artificial Turf Systems	Norwegian Institute for Water Research, 2005	Full Text
Evaluation of Health Effects of Recycled Waste Tires in Playground and Track Products	CIWMB, OEHHA, 2007	Full Text
Exposures to Recycled Tire Rubber Crumbs Used on Synthetic Turf Fields, Playgrounds and as Gardening Mulch	Environment & Human Health, Inc (non-profit organization), 2007	Full Text
Field Study of Shredded Tire Embankment	Virginia Department of Transportation, 2004	Full Text

Water-Quality Effects of Tire Shreds Placed Above the Water Table: Five Year Field Study	Transportation Research Record, Vol 1714/2000, Jan 24, 2007, p18-24, D. Humphrey, L.E. Katz	REF039.pdf
Foliar Accumulation of Zinc in Tree Species Grown in Hardwood Bark Media Amended with Crumb Rubber	Journal of Plant Nutrition Jul2003, Vol 26 Issue 7, p1413 13p, E. Bush, A. Owings, K. Leader	REF015.pdf
Environmental and Health Assessment of the use of Elastomer Granulates (Virgin and from Used Tyres) as Filling in Third-Generation Artificial Turf	FieldTurf Tarkett, Aliapur, EEDEMS, ADEME, 2007, R. Moretto	Full Text
Review of the Human Health and Ecological Safety of Exposure to Recycled Tire Rubber found at Playgrounds and Synthetic Turf Fields	Rubber Manufacturers Association, 2008, ChemRisk, Inc Pittsburgh PA	Full Text
Synthetic Turf From A Chemical Perspective	Swedish Chemicals Inspectorate, 2006	Full Text
Synthetic Playfields Task Force Findings and Department Recommendations Report to San Francisco Recreation and Parks	San Francisco Recreation and Park Department, 2008	Full Text
Literature Review of the Water Quality Effects of Tire-Derived Aggregate and Rubber Modified Asphalt Pavement	RCC Scrap Tire Workgroup, 2006	Full Text
A Study to Assess Environmental Impacts from the Use of Crumb Rubber as Infill Material in	NYS Department of Environmental Conservation, 2008	Full Text

Synthetic Turf Fields		
Toxicological Evaluation for the Hazard Assessment of Tire Crumb for Use in Public Playgrounds	Journal of the Air & Waste Management Association, 2003, Birkholz, D.A., Belton, K.L., Guidotti, T.L.	Full Text
Water Quality for Whitter Farm Road Tire Shred Field Trial	Department of Civil and Environmental Engineering, University of Maine, Orono, Maine, 1999, Humphrey, D.N.	Full Text
Zinc in Drainage Water Under Artificial Turf Fields (original and update)	INTRON, 2008	Full Text Full Text
Environmental Impacts of Recycled Rubber in Light Fill Applications: Summary and Evaluation of Existing Literature	Rubber Chemistry and Technology 2000, 1998, Liu, H.S., Mead, J.L., Stacer, R.G.	Full Text
Fate and Effect of Zinc from Tire Debris in Soil	Environmental Science & Technology, Sep 2002, Vol 36, Issue 17, p3706 5 pgs, Smolders, E., Degryse, F.	REF046.pdf
The Leaching of Inorganic Species from Activated Carbons Produced from Waste Tyre Rubber	Water Research, Vol 36, Issue 8, April 2002, pgs 1939-1946, San Miguel, G., Fowler, G.D., Sollars, C.J.	REF048.pdf

6.0 INGESTION

Ingestion of crumb rubber products can occur directly, by ingestion of surface water runoff, through inhalation of dust and through dermal absorption. In vitro mutagenicity research and

hazard analysis suggest very low risk associated with the use of crumb rubber product in playground and athletic field surface applications. A fact sheet issued by the Connecticut Department of Health (CDH) confirms low public health risks and points out that the amount of crumb rubber particles entering the air through surface wear compares to amounts generally found in suburban and urban air from wearing of tires, car exhaust fumes, foods, consumer products, flooring and furnaces. The CDH does acknowledge gaps in information that warrant further investigation. A Norwegian study conducted in 2006 examined the risk of ingestion through inhalation, oral ingestion and skin absorption of recycled rubber used in indoor athletic surfaces and found that exposure to phthalates, alkyl phenols, and airborne dust was too low to cause elevated health risks. A 2007 study conducted by the California Integrated Waste Management Board confirmed these findings and further tested multiple carcinogenic and non-carcinogenic substances occurring in crumb rubber. It determined that no elevated health risk is to be expected following a one-time ingestion of 10 grams of the material.

An extensive study conducted by the California Integrated Waste Management Board (CIWMB) and the Office of Environmental Health Hazard Assessment in 2007 analyzed carcinogenic substances, including arsenic, cadmium, lead, benzene, trichloroethylene, aniline and naphthalene in crumb rubber and concluded that a one-time ingestion would not exceed *de minimis* risk levels. The findings of these recent studies agree with the findings of a 2003 genotoxicity study that found no DNA or chromosome damaging chemical release upon crumb rubber ingestion.

A case study of Tire Crumb use on Playgrounds: Risk Analysis and Communication When Major Clinical Knowledge Gaps Exist	Environmental Health Perspectives Jan 2006, Vol 114 Issue 1, p1 3p, M.E. Anderson, K.H. Kirkland, T.L. Guidotti, C. Roase	Full Text
Fact Sheet: Artificial Turf Fields: Health Questions	CT Department of Public Health, 2007	Full Text
Artificial Turf Pitches – An Assessment of the Health Risks for Football Players	Norwegian Institute of Public Health and the Radum Hospital, 2006	Full Text
Evaluation of Health Effects of Recycled Waste Tires in Playground and Track Products	CIWMB, OEHHA, 2007	Full Text

Exposures to Recycled Tire Rubber Crumbs Used on Synthetic Turf Fields, Playgrounds and as Gardening Mulch	Environment & Human Health, Inc (non-profit organization), 2007	Full Text
The Use of Scrap Tire as Playground Material	Rubber Manufacturers Association	Full Text
Preliminary Assessment of the Toxicity from Exposure to Crumb Rubber: Its use in Playgrounds and Artificial Turf Playing Fields	NJ Department of Environmental Protection, 2007, T. Ledoux	Full Text
Toxicological Evaluation for the Hazard Assessment of Tire Crumb for Use in Public Playgrounds	Journal of the Air & Waste Management Association, 2003, Birkholz, D.A., Belton, K.L., Guidotti, T.L.	Full Text
A Review of the Potential Health and Safety Risks from Synthetic Turf Fields Containing Rubber Infill	NYC Department of Health and Mental Hygiene, 2008, Denly, E., Rutkowsky, K., Vetrano, K.	Full Text

7.0 Staph Infection

As pointed out by the New York State Department of Health, studies concerning an increased occurrence of infection on artificial turf versus natural turf have been inconclusive. A disease outbreak investigation did not identify playing fields, natural or artificial, as contributors to an increased risk of staph infections. A 2005 report from the Illinois Department of Public Health attributes such outbreaks primarily to the sharing of equipment and matters of hygiene combined with increased skin abrasions, cuts incurred from body shaving and close contact between athletes.

Research by the San Francisco Synthetic Playfields Task Force in 2008 found no evidence for concern regarding an increase in staph infection risk from playfields and recommends posted guidelines near such fields, stating basic hygiene and first aid instructions.

A High-Morbidity Outbreak of Methicillin-Resistant Staphylococcus Aureus Among Players on a College Football Team, Facilitated by Cosmetic Body Shaving and Turf Burn	Clinical Infectious Diseases Mar 2005 15; 40(6): 906-7, E.M. Begier, K. Frenette, N.L. Barrett, P. Mshar, S. Petit, D.J. Boxrud, K. Watkins-Colwell, S. Wheeler, E.A. Cebelinski, A. Glennen, D. Nguyen, J.L. Hadler	Full Text
Outbreak of Methicillin-Resistant Staphylococcus Aureus Skin Infections Among High School Athletes in Illinois	Illinois Department of Public Health, 2005, S.M. Borchardt	Full Text
Fact Sheet: Crumb-Rubber Infilled Synthetic Turf Athletic Fields	NYS Department of Health, 2008	Full Text
Synthetic Playfields Task Force Findings and Department Recommendations Report to San Francisco Recreation and Parks	San Francisco Recreation and Park Department, 2008	Full Text
A Review of the Potential Health and Safety Risks from Synthetic Turf Fields Containing Rubber Infill	NYC Department of Health and Mental Hygiene, 2008, Denly, E., Rutkowsky, K., Vetrano, K.	Full Text

8.0 Allergies/Latex

This section lists a number of studies pertaining to concerns regarding latex to which approximately 6% of the general population is allergic. Latex allergies caused by tire dust as it occurs in urban air pollution must be distinguished from the risk potential for such allergies in recycled rubber surfaces. The vulcanized chemistry of tire manufacture destroys these allergens, which typically eliminates the risk of allergies through contact with the rubber surface. This observation was confirmed by research from the Norwegian Institute of Public Health, although the risk of developing latex allergies or causing asthma attacks in those who have previously developed it could not be excluded for sensitive individuals exposed to tire dust from rubber surfaces in indoor areas. The California Integrated Waste Management Board conducted

a controlled skin sensitization study in 2007 and concluded that playground surfaces made from recycled tire rubber do not constitute a skin sensitization risk to children.

A case study of Tire Crumb use on Playgrounds: Risk Analysis and Communication When Major Clinical Knowledge Gaps Exist	Environmental Health Perspectives Jan 2006, Vol 114 Issue 1, p1 3p, M.E. Anderson, K.H. Kirkland, T.L. Guidotti, C. Roase	Full Text
Artificial Turf Pitches – An Assessment of the Health Risks for Football Players	Norwegian Institute of Public Health and the Radum Hospital, 2006	Full Text
Evaluation of Health Effects of Recycled Waste Tires in Playground and Track Products	CIWMB, OEHHA, 2007	Full Text
Exposures to Recycled Tire Rubber Crumbs Used on Synthetic Turf Fields, Playgrounds and as Gardening Mulch	Environment & Human Health, Inc (non-profit organization), 2007	Full Text
Fact Sheet: Crumb-Rubber Infilled Synthetic Turf Athletic Fields	NYS Department of Health, 2008	Full Text
Preliminary Assessment of the Toxicity from Exposure to Crumb Rubber: Its use in Playgrounds and Artificial Turf Playing Fields	NJ Department of Environmental Protection, 2007, T. Ledoux	Full Text
Review of the Human Health and Ecological Safety of Exposure to Recycled Tire Rubber found at Playgrounds and Synthetic Turf Fields	Rubber Manufacturers Association, 2008, ChemRisk, Inc Pittsburgh PA	Full Text

9.0 Additional Considerations

Significant consideration should be given to the benefits of using recycled tire materials over alternative landfill disposal of tires in environmental and resource preservation efforts. As discussed in a 2003 Tellus Report, discarding of tires in landfills carries multiple disadvantages, ranging from toxic runoff and tire pile fire emissions to the rise in mosquito borne diseases and unfavorable land use. According to the report, 281 million scrap tires were generated in the year 2001 alone.

In addition to the studies listed above, which primarily address the use of recycled tire rubber in playfield applications, research has also been conducted on crumb rubber effects in construction processes, landfill runoff barriers, asphalt pavement and landscaping mulch. The findings of these studies in matters of human and environmental health generally agree with those of the playfield studies. Research is furthermore available on the risk of injury from falls onto rubber surfaces as compared to alternative materials. Findings conclude an overall decreased risk of injury where rubberized surfaces have been installed.

Recycled Rubber Products in Landscaping Applications	Tellus Institute, 2003, Stutz, J., Donahue, S., Mintzer, E., Cotter, A.	Full Text
Assessment of Water Pollutants from Asphalt Pavement Containing Recycled Rubber in Rhode Island	Transportation Research Record, 1998, 1626, 95-104, Vashisth, P., Lee, K.W., Wright, R.M.	REF044.pdf
Groundwater Effects from Highway Tire Shred Use	Environmental Forensics, 2004, Vol 5, No. 2, pp.79-84, Brophy, >m, Graney, J.	REF047.pdf
Safety of Surfaces and Equipment for Children in Playgrounds	Lancet 06/08/97, Vol 349 Issue 9069, p1874 3p, Mott, A., Rolfe, K.	

		REF049.pdf
Field Evaluation of a Leachate Collection System Constructed with Scrap Tires	Journal of Geotechnical and Geoenvironmental Engineering, Aug 2006, Vol 132 Issue 8, p990-1000 11p; 2 charts, Aydilek, A., Madden, E.T., Demirkan, M.	REF012.pdf
What Lies Beneath	Parks & Recreation, Nov 2005, Vol 40, Issue 11, p52-59 8p, Spencer, A.	Full Text
Effectiveness of Scrap Tire Chips as Sorptive drainage Material	Journal of Environmental Engineering, Vol 130, Issue 7, pp824-831, Edil, T.B., Park, J.K., Kim, J.Y.	REF006.pdf
Physical and Chemical Properties of Recycled Tire Shreds for Use in Construction	Journal of Environmental Engineering, 2003, 129, 10, 921-929, Moo-Young, H., Sellasie, K., Zeroka, D., Sabnis, G.	REF023.pdf
The Ease of Ignition of 13 Landscape Mulches	Journal of Arboriculture Nov 2003, Vol 29, Issue 6, p317-321 5pgs, Steward, L.G., Sydnor, T.D., Bishop, B.	Full Text
Evaluation of Recycled Rubber Mulch Products	Georgia Department of Transportation Office of Materials and Research, 2001, Jared, D.M.	Full Text
Field Study of Shredded-Tire Embankment	Transportation Research Record 1619, Transportation Research Board, 1998, Hoppe, E.J.	Full Text

Height and Surfacing as Risk Factors for Injury in Falls from Playground Equipment: A Case-Control Study	Injury Prevention, 1996, Vol 2, Issue 298-108, Chamlers, D.J. et al	REF017.pdf
Preventing Injuries on Horizontal Ladders and Track Rides	Injury Control and Safety Promotion Dec 2004, Vol 11 Issue 4, p219-224 6p, Nixon, J.W., Acton, C., Wallis, B.A., Battistutta, D., Perry, C., Eager, D.	Full Text

Glossary of Scrap Tire Terminology

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TIRE RECYCLING

The Effects of PU Coated Rubber Mulch on the Leaching of Contaminants Compared to Uncoated and Acrylic/Latex Coated Rubber Mulch

The Effects of PU Coated Rubber Mulch on the Leaching of Contaminants Compared to Uncoated and Acrylic/Latex Coated Rubber Mulch

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Abstract

This experiment was designed to determine whether polyurethane (PU) or acrylic/latex coated rubber mulch would inhibit the leaching of contaminants into the soil. Two tanks were filled with distilled water and allowed to recirculate over the rubber: uncoated rubber mulch in the first tank and PU coated rubber mulch in the second tank. Water samples from each tank were then analyzed by an environmental laboratory over the course of twelve weeks. In addition to this primary experiment, a TCLP test was performed on new samples of uncoated rubber mulch, PU coated rubber mulch, and acrylic/latex rubber mulch. The results of the testing indicate that PU coated rubber mulch inhibits the leaching of zinc by 30 – 69% over both uncoated and acrylic/latex coated rubber mulch.

Introduction

A new type of mulch has recently made its way to store shelves. This new rubber mulch offers the consumer several advantages over wood mulch. For example, "… wood mulch and bark biodegrade and, thus, must be replaced annually. Once rubber mulch is put down, it's there to stay. Aging studies show that rubber mulch can remain in good shape for a decade or longer… " [1]. Rubber mulch also tends to be more dense than wood mulch and is therefore less likely to be blown away by wind or rain [1]. Besides its uses in the garden, rubber mulch provides a safe playground surface because of its high critical fall protection [2]. Because of these advantages, rubber mulch has increased in production with, ". . . dramatic market growth rates of 10 to 20 percent a year or more." [1], and with this gain the concern over the environmental effects of using shredded tires has been voiced by some environmentalists.

The primary concern over using shredded tires as rubber mulch is the fact that the tires contain elements such as zinc. During the manufacturing of rubber tires, "Zn is added to tire tread rubber mostly as zinc oxide (ZnO), and in lesser quantities as a variety of organozinc compounds, to facilitate vulcanization of the rubber." [5]. Zinc may negatively affect plant life if leached from the rubber mulch and into the ground [4]. One way to reduce this leaching may be to coat the rubber mulch with PU. The hypothesis of this experiment was that a PU coating acts as both a colorant as well as a sealant that prevents undesirable contaminants such as zinc from entering the soil beneath. With these experiments, the leaching effects of PU coated rubber mulch were compared to acrylic/latex coated as well as uncoated rubber mulch. In addition to Zinc, Cadmium, and Lead, Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), Polychlorinated Biphenyls (PCBs), Benzene, Phenols, Nitrosamines, and Phthalate levels were also analyzed.

These experiments were designed to address the question of whether rubber mulch coated in PU would inhibit the leaching of contaminants as compared to acrylic/latex coated and uncoated rubber mulch. To test this hypothesis, a simulated leaching environment was constructed in two aquariums to approximate a twelve week constant water exposure. In addition to the primary experiment, samples of uncoated, PU coated and acrylic/latex coated rubber mulch were submitted for TCLP testing.

Methods and Materials

Two 5 gallon fish tanks were filled and labeled as "Tank 1" and "Tank 2". Both tanks were covered to prevent evaporation. A

common aquarium pump was placed in the bottom of each tank to recirculate the water. Two plastic bottles (HDPE) were perforated on the bottom and filled with rubber mulch (100 grams per bottle), then placed inside each corresponding tank above the water level. The bottle in Tank 1 was filled with uncoated rubber mulch (100 grams), while the bottle in Tank 2 was filled with PU coated rubber mulch (100 grams + 3.0% PU coating). The plastic tubing from the pumps was then placed above the plastic bottles so that the water from each tank was drawn up and over the rubber mulch which then drained through the holes in the bottom, reentering the water in the tank. The perforation of the bottles as well as the flow rate of the pumps was adjusted to allow the bottles to be nearly full of water so that the rubber was entirely submersed. This process occurred continuously for three months.

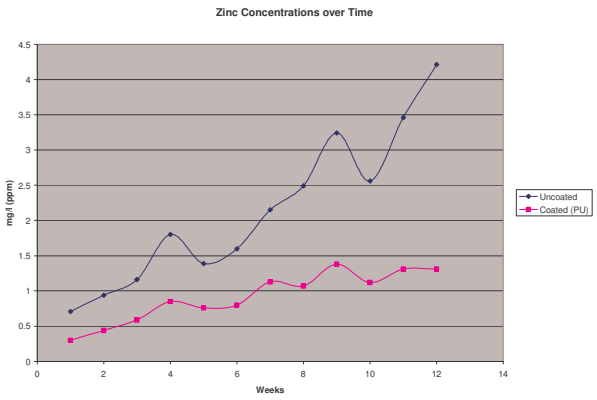
Before the rubber mulch was added to the plastic bottles, the tank setups were allowed to recirculate for one week, and then samples of the water were taken from each tank and analyzed to determine blank values. These blank values were subtracted from all proceeding results to eliminate any preexisting detectable quantities of the analytes of interest. All metals testing was performed by Reliance Laboratories, Inc. located in Bridgeport, WV. After the initial blank values were determined, a sample was collected from each tank once a week and labeled according to the tank from which it originated. The samples were sent to the lab and labeled as "Sample 1" and "Sample 2" to eliminate any bias. These weekly samples were tested by Reliance for metal content.

In addition to the weekly metal content testing, each sample was tested monthly for VOCs, PAHs, PCBs, Benzene, Phenols, Nitrosamines, and Phthalates. Reliance Laboratories tested VOC content and then outsourced the PCB and Semi-Volatiles (including PAHs) testing to AC & S, Inc. located in Nitro, WV. This system of measuring metals each week and monthly VOC, PAH, and PCB testing continued for twelve consecutive weeks. At the end of this testing, an additional TCLP test was conducted by Reliance Laboratories in conjunction with AC & S, Inc. with three new samples: PU coated rubber mulch, acrylic/latex coated rubber mulch and uncoated rubber mulch.

Results

Of all analytes screened, only zinc was found in detectable quantities for both the PU coated and uncoated rubber mulch (EPA method 6010C*). The following table (Table 1) illustrates the increase in zinc levels between the two samples over the twelve week duration.

Table 1: Zinc Concentrations over Time



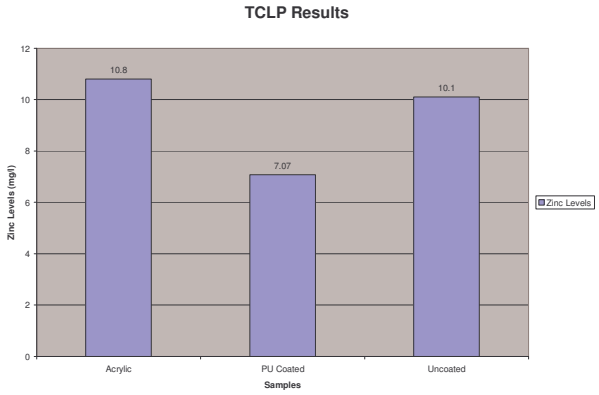
Note: The small fluctuations in results are most likely due to testing error.

The results of the metal testing illustrate that neither the PU coated or uncoated rubber mulch exceeded the Secondary Maximum Contaminate Levels (SMCLs) set by the Environmental Protection Agency of 5 mg/l [3] during the twelve week testing procedure; however, the uncoated rubber mulch leached more than three times the amount of zinc (4.21mg/l) than the PU coated rubber mulch (1.31 mg/l) by the twelfth week.

* See Appendix A for descriptions of EPA Methods

In addition to the three month experiment in which metals, VOCs, PAHs, PCBs, Benzene, Phenols, Nitrosamines and Phthalates were tested (EPA methods 8260B, 8082A, and 8270), a separate Toxic Characteristics Leaching Procedure (TCLP) with a 48 hour extraction time (EPA method 1311) was performed at the conclusion of the primary experiment. The TCLP test was conducted on three new samples: uncoated rubber mulch, PU coated rubber mulch and acrylic/latex coated rubber mulch. Because the TCLP test is conducted under much more aggressive conditions than was the primary experiment, higher concentrations of zinc were found for each sample. The following table illustrates the levels of zinc in each sample.

Table 2: TCLP Zinc Level Results



By TCLP method, similar levels of zinc were found in the acrylic/latex coated and uncoated rubber mulch samples; while the PU coated rubber mulch leached 30% less zinc than the uncoated and 34% less than the acrylic/latex coated. These levels exceed the EPA's SMCLs for zinc (5mg/l)[3], but were detected after an aggressive leaching procedure that is designed to simulate leaching in acidic conditions not normally found where rubber mulch would be used (e.g. playgrounds and landscaped areas).*

Discussion/Conclusion

As a result of all tests performed, only zinc was detected in significant quantities. Zinc poses a concern because it can hinder plant growth in high quantities [4]. The results of this test indicate that the leaching of zinc is inhibited by a coating of PU. In the case of our tank method of simulating leaching over time, the PU coated rubber mulch leached 69% less than did the uncoated rubber mulch. According to the aggressive TCLP method, the PU coated rubber mulch reduced the leaching of zinc by 30% compared to uncoated rubber mulch and 34% compared to acrylic/latex coated rubber mulch. The data from this test indicates that all types of coatings do not necessarily inhibit the leaching of zinc, because the acrylic/latex coating exhibited no inhibiting effect. Conversely, a PU coating significantly inhibited the leaching of zinc. In conclusion, if the level of zinc is a concern to consumers of rubber mulch, PU coated rubber mulch will decrease this effect compared to uncoated rubber mulch, while acrylic/latex coating displays no significant decrease in the leaching of zinc.

* A note about the EPA's SMCLs: These levels are only guidelines and not enforced standards such as the National Primary Drinking Water Regulations. They pertain to contaminants that pose no health danger but may be aesthetically undesirable in the water supply[3]

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Appendix A: Descriptions of EPA Methods Used

EPA METHOD	Description
6010C	Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES): Used to determine trace elements in solution.
1311	Toxicity Characteristic Leaching Procedure: the TCLP is designed to determine the mobility of both organic and inorganic analytes present in liquid, solid and multiphasic wastes.
8260B	Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS): used to determine volatile organic compounds in a variety of solid waste matrices.
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography: used to determine the concentrations of polychlorinated biphenyls (PCBs) as Aroclors or as individual PCB congeners in extracts from solid, tissue, and aqueous matrices, using open-tubular, capillary columns with electron capture detectors (ECD) or electrolytic conductivity detectors (ELCD).
8270	Semi volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): used to determine the concentration of semi volatile organic compounds in extracts prepared from many types of solid waste matrices, soils, air sampling media and water samples.

***SOURCE: http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm**

Liberty
TIRE RECYCLING

Limited EPA Study Finds Low Level of Concern in Samples of Recycled Tires from Ballfield andPlayground Surfaces

Limited EPA Study Finds Low Level of Concern in Samples of Recycled Tires from Ballfield and Playground Surfaces

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FOR IMMEDIATE RELEASE
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WASHINGTON - The U.S. Environmental Protection Agency has released results of a limited field monitoring study of artificial-turf playing fields and playgrounds constructed with recycled tire material or tire crumb. The study was intended to gain experience conducting field monitoring of recreational surfaces that contain tire crumb. EPA will use the information to help determine possible next steps to address questions regarding the safety of tire crumb infill in recreational fields.

“The limited data EPA collected during this study, which do not point to a concern, represent an important addition to the information gathered by various government agencies,” said Peter Grevatt, director of EPA’s Office of Children’s Health Protection. “The study will help set the stage for a meeting this spring, where EPA will bring together officials from states and federal agencies to evaluate the existing body of science on this topic and determine what additional steps should be taken to ensure the safety of kids who play on these surfaces.”

Recycled tire material, or “tire crumb,” is used in many applications, including as a component in synthetic turf fields and playground installations. In response to concerns raised by the public, EPA conducted a limited “scoping study” of tire crumb, which consisted of collecting air and wipe samples at three locations near EPA laboratories at Raleigh, N.C., Athens, Ga., and Cincinnati, Ohio. Sampling also was conducted in the Washington, D.C. area.

The limited study, conducted in August through October 2008, found that the concentrations of materials that made up tire crumb were below levels considered harmful. However, given the limited nature of the study (limited number of constituents monitored, sample sites, and samples taken at each site) and the wide diversity of tire crumb material, it is not possible, without additional data, to extend the results beyond the four study sites to reach more comprehensive conclusions.

The study confirmed that most of the methods tested were accurate, reproducible and appropriate for measuring concentrations of tire crumb constituents and therefore can be used in future studies.

Study findings

- Particulate matter, metals and volatile organic compound concentrations were measured in the air samples and compared with areas away from the turf fields (background levels). The levels found in air samples from the artificial turf were similar to background levels.
- No tire-related fibers were observed in the air samples.
- All air concentrations of particulate matter and lead were well below levels of concern.
- More than 90 percent of the lead in the tire crumb material was tightly bound and unavailable for absorption by users of the turf fields.
- Zinc, which is a known additive in tires, was found in tire crumb samples. However, air and surface wipe monitoring levels of zinc were found to be below levels of concern.

EPA is aware that studies by other agencies were undertaken or completed while this survey was under way. EPA is planning a 2010

meeting with federal and state agencies to review all new study data and determine next steps.

More information on artificial turf: http://www.epa.gov/nerl/features/tire_crumbs.html

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SEPA study OKs recycled rubber surfaces

by Mike Breslin

According to the Synthetic Turf Council, artificial turf has been installed in approximately 4,500 American fields, tracks and playgrounds. The new study conducted by the EPA indicates that this artificial turf poses no significant health or environmental issues.

It's been a long wait for the United States Environmental Protection Agency (EPA) to weigh in on the safety of recreational products made from recycled tires. Finally, it released the results of a limited field monitoring study of artificial turf playing fields and playgrounds using recycled tire material or tire crumb. EPA plans to use the study information to help determine the next step to address questions regarding the safety of tire crumb infill in recreational fields.

In short, the EPA study found that using the material does not point to a concern for the agency at this time. This is another positive reinforcement for this sector of the recycling industry, which already knew from numerous laboratory analyses, state studies and independent field studies that the material posed little or no environmental danger or health risks.

Liberty Tire Recycling, the country's largest recycler of scrap tires processes 110 to 120 million tires per year. Company president Don Rea commented on the EPA study, "There has been somewhere between 50 to 100 studies on crumb rubber. There has been so much study done that it doesn't seem possible that someone is going to come up with another

conclusion. It would have been nice if the EPA had just said this stuff is fine, forget it. If EPA was the least bit suspicious they would not have said what they said."

Over the years, shredded and crumb rubber processed from recycled tires has found its way into many useful recreational and architectural applications. These include rubberized ground covers under playground equipment, running track material, soil additives for playing fields and sports flooring. Crumb rubber is also used in artificial turf fields between turf fibers to provide stability and resiliency.

According to the Synthetic Turf Council artificial turf has been installed in approximately 4,500 American fields, tracks and playgrounds. Synthetic turf was originally used in stadiums and on athletic fields for college and professional sports teams, but now is also used in municipal parks, golf courses, playgrounds, on cruise ships, in airports and residences for lawns. In addition, recycled tires are being processed into colorized mulches for residential and commercial applications, a growing market that exposes more people each year to the material.

This rubberization of surfaces offers many benefits to help prevent injuries and reduce stress on leg muscles, ligaments, tendons and joints, and accounts for its widespread and increased use. This ability to absorb shock has taken rubberized surfacing into homes, workplaces, tennis courts, weight rooms, gyms, fitness centers and even to the equine and bovine worlds. And because it's easier to clean and cleans more thoroughly, it's more hygienic than other flooring materials such as wood or concrete.

Cow mats made from recycled tires are increasingly being used in dairy barns all over North America. Just like preventing injuries for humans in recreation and sport, cow mats prevent calves from getting hurt when they fall on concrete barn floors. The insulating properties also reduce cold and humidity on concrete floors to help protect cows against rheumatism and fatigue. Some diaries even attribute increased milk production to rubber flooring.

Abacus Sports Installations, Ltd., for instance, markets a wide variety of rubberized sports flooring made from recycled tires. Their seamless, textured equine flooring for stables is very popular because it's easier to clean and minimizes bacteria. It's even installed on stable walls and columns for added protection.

Spencer Proud, owner of Abacus said that his customers have never voiced any concern about the safety of his company's products. "We've never had any complaints or issues in

over 20-years of contracting. From an architectural standpoint many of our customers are interested in earning LEED credits (Leadership in Energy and Environmental Design Green Building Rating System) It's recycled material, very durable, very sustainable. School boards and everyone else these days wants everything to be green for very good reasons. Having this recycled content brings serious contributing points."

Nevertheless, over the past several years, a number of concerns have been raised over the use of tire crumb materials in turf fields and playgrounds.

Parents in Colorado were concerned about children carrying home small particles of tire crumbs on their clothing. High levels of lead were detected on some artificial turf fields in New Jersey. To address various public concerns, a number of cities and states engaged in sampling, testing and evaluation of products containing recycled tire rubber.

In 2007, the California Office of Environmental Health Hazard Assessment issued a report, Evaluation of Health Effects of Recycled Waste Tires in Playground and Track Products. It concluded that there appeared to be little long-term risk to human health.

In 2008, the Centers for Disease Control and Prevention issued a low-level public health advisory, due to some negative publicity surrounding artificial turf.

The Consumer Product Safety Commission investigated reports of lead contamination from artificial turf and, in July 2008, concluded that "young children are not at risk from exposure to lead in these fields."

A July 2009 California EPA study found no significant health risk to people who breathe the air above synthetic turf that contains crumb rubber. The study looked at the chemicals found in the air above the turf and the chemicals found in the air upwind from the fields analyzed. The conclusion: chemicals were found in similar concentrations in both samples.

A May 2009 study by the New York departments of Environmental Conservation and Health found that crumb rubber used in synthetic turf fields poses no significant environmental threat or health concerns.

Finally, in December, the national response came with the release of the results of EPA's limited "scoping study" of tire crumb. The study consisted of collecting air and wipe samples at locations near EPA laboratories in Raleigh, North Carolina, Athens, Georgia, and Cincinnati, Ohio. Sampling was also was done in Washington, D.C.

Conducted from August to October 2008, the study found that the concentrations of materials that made up tire crumb were below levels considered harmful. “The limited data EPA collected during this study, which do not point to a concern, represents an important addition to the information gathered by various government agencies,” said Peter Grevatt, director of EPA’s Office of Children’s Health Protection “The study will help set the stage for a meeting this spring, where EPA will bring together officials from states and federal agencies to evaluate the existing body of science on this topic and determine what additional steps should be taken to ensure the safety of kids who play on these surfaces,” he added.

As usual, EPA qualified the findings of its study: “Given the limited nature of the study (limited number of constituents monitored, sample sites, and samples taken at each site) and the wide diversity of tire crumb material, it is not possible, without additional data, to extend the results beyond the four study sites to reach more comprehensive conclusions.”

However, the EPA study did confirm, most importantly, that most of the methods tested were accurate, reproducible and appropriate for measuring concentrations of tire crumb constituents and can be used in future studies.

EPA is aware that studies by other agencies were undertaken or completed while its survey was being conducted. EPA is planning a 2010 meeting with federal and state agencies to review all new study data and determine next steps.

The next steps will likely involve more government spending for more studies to arrive at essentially the same conclusions. Meanwhile, more products made from recycled tires will keep more old tires out of landfills and continue to find new and useful applications.