

TREACHEROUS TURF

**The Toxic Hazards
of
Crumb-Rubber Artificial Playing Fields**

A compilation of official analyses on the subject

by

A Concerned Neighbor

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Author's Note

Leading public advisory authorities have openly criticized tire turf as a potentially grave health threat facing American children. We can appreciate the accuracy of these reputable accusations about tire turf by observing the willingness of public health authorities to publicize such potentially libelous statements about a multi-billion dollar industry. Already burdened with all of the world's crises, America's top-ranking health officials would not have prompted this serious public health scare without just cause.

These accusations could lead to the destruction of the tire turf industry and the related practice of using children's playing fields as a giant used tire repository. Perhaps most worrisome to certain special interests, public disclosure of the health risks posed by tire turf could prompt billions of dollars in lawsuits, targeting manufacturers and owners. It is no surprise that the industry is aggressively misleading the public by supporting slanted studies that have declared the material safe, contradicting their own public admissions about the heat-stroke risk and a wide body of authoritative scientific evidence concluding that the material is toxic.

Today, the scientific community has weighed in on the subject and concluded that children's playing fields should not be composed of a carcinogenic base that warms to 60° (F) above air temperature. In this latest saga of corporate malfeasance, we hear echoes of past scandals over banned products like DDT, asbestos, vinyl chloride, cigarettes, and all of the other poisons that disreputable businessmen have mass marketed. Judging from these past examples, perhaps a moratorium on lawsuits would best facilitate removing tire turf from the market. Despite growing grassroots movements to outlaw the product, a nationwide ban has yet to coalesce. Until federal law reflects this scientific consensus, it is our individual responsibility to spread awareness of this public health danger.

SUMMARY

Allegations?

Toxic Hazard: For the past decade, a foreign company has been working all over America to install a next-generation AstroTurf composed of the pulverized remains of disposed tires. Each one of these crumb-rubber athletic playing fields contains *20,000 shredded tires*, including all of the lead and carcinogens used to make tires durable. Instead of being confined to the interior of tires, however, these toxic substances are readily emitted as vapors, dust and transferable particles by the crumb turf in amounts exceeding legal limits. This hazard particularly affects players engaged in rigorous physical activity over large areas of the field because they are deeply inhaling maximum volumes of the contaminated air and touching massive quantities of the contaminants. Warm weather also increases the toxic hazard of these playing fields.

Failure to Warn Users: Many owners (including Kingswood-Oxford of West Hartford, Connecticut) have not posted signs or otherwise alerted users about the established heat risk and toxic hazards of tire-turf fields, ignoring CDC guidelines which authorize owners to post warnings of known health hazards to users. A separate CDC health advisory specifically recommends that users of these playing fields observe strict prevention and decontamination protocols for toxic exposure.

Legal and Civil Actions

Along with a growing number of European nations, **America's two largest cities have banned installations** of crumb-rubber playing fields and started removing the most contaminated sites. In addition to these landmark legal decisions by New York City and Los Angeles, numerous lawsuits are pending against manufacturers. Most notably, the state of California is suing the industry-leader, a foreign corporation known as FieldTurf Tarkett (maker of the Kingswood-Oxford field).

Leading Critics

National Public

Health Authorities: **The CDC and EPA**

State Governments: **Connecticut and California**

City Governments: **New York City and Los Angeles**

News Media:

NY Times, USA Today, Wall Street Journal, LA Times, Chicago Tribune, Boston Globe, CBS / NBC / ABC / PBS News

THE TOXIC HAZARDS OF CRUMB-RUBBER PLAYING FIELDS

For the past decade, some communities across America and Europe have been replacing the grass turf in playing fields with synthetic material made from the pulverized remains of disposed tires. This new trend in artificial turf has been touted as an effective way to reduce maintenance costs and raise the usage of athletic fields. Constructed of plastic artificial grass and a simulated dirt made from the cheap rubber granules, the tire turf meets industry standards for facilitating water drainage and increasing the speed of play.

Aside from a lower price tag, tire turf manufacturer's can boast no significant advantage over alternatives in artificial turf (like "FlexSand") that are not composed of used tires. **According to FieldTurf Tarkett, the leading manufacturer of crumb-rubber turf, they dump over 100 tons of waste from tire reclamation plants into each one of their playing fields for children** in order to serve the green revolution. This specious logic posits that tire turf saves the environment from the highly pollutive industrial processes traditionally employed to dispose of the hazardous ingredients in used tires.

Tire turf's "green miracle" is accomplished by storing the hazardous waste, including lead and several carcinogens, inside children's playing fields for five to ten years. There the chemicals are contained in a sealant that readily degrades, leeching and vaporizing toxins from the surface where children, engaged in rigorous physical activity, are most likely to touch maximum surface area and deeply inhale the largest volumes of air. The unique combination of risk factors for toxic exposure that is inherent to tire turf playing fields poses at least a significant public health threat, and at worst one of the most scandalous examples of a profit-blinded industry poisoning communities across America.

Among the multiple health hazards posed by the tire turf, such as asthmatic and allergic reactions, heat stroke and MRSA infections, exposure to these toxins ranks as the most dangerous threat. This toxic exposure can result in brain damage, a spectrum of cancers, toxicity of the liver and kidneys, as well as lung, digestive, and developmental disorders. Manufacturers of crumb-rubber turf have conspicuously neglected to inform the public about any of the numerous potential hazards caused by their product, and only a rising chorus of authoritative opposition has exposed this public health threat.

Whereas at one time the lure of a price reduction over alternatives in artificial fields had created a booming market for tire turf, today the crumb-rubber fields face moratoriums that herald the collapse of yet another toxic enterprise launched by the petro-chemical industry. After years of painstaking studies, leading public health authorities are finally announcing the concerns of the scientific community that tire turf is in fact toxic. These official guardians of national and global public health include:

- The Centers for Disease Control and Prevention (CDC),
- Connecticut's renowned Attorney General Richard Blumenthal,
- The cities of New York and Los Angeles,
- The states of California and New Jersey, and
- A growing number of European nations.

Scientific Disclosures

Each field contains the remains of 20,000 shredded tires, composed of numerous neurotoxins and carcinogens. Even on brand-new tire turf there is no barrier between the “sealed” rubber crumbs and the players on the field. The protective sealant on the rubber crumbs degrades from aging, sunlight, weathering and user wear, constantly exposing the toxic ingredients of the tire remains to players. Only rainfall and irrigation can limit the toxic resin that continuously accumulates on a used field’s surface, though this cleaning is only accomplished by washing recently emitted toxins into the groundwater. During play, the tire crumbs and their deadly residue are physically unstable and, like pellets of mud, attach to players as they touch and run over hundreds and thousands of square feet on the field. In turn, these toxins are either ingested by contact with unwashed hands or spread to the interiors of cars and homes via the players’ clothes and shoes.

Beyond leeching, crumb fields also emit the chemicals as dust and vapors that are easily inhaled, particularly by people running and especially on warm days. Compared with other sources of human exposure to tire dust (excluding the tire manufacturing industry, where workers have a well-documented record of serious health effects from breathing tire dust), the potential for hazardous inhalation is enhanced because of two characteristics unique to the crumb-rubber playing field, (1) it releases concentrated amounts of the dangerous toxins in close proximity to unguarded humans while they are inhaling maximum volumes of air, (2) on warm days, this vaporization effect is magnified when the turf, composed of 20,000 tires, heats to 40° - 60° (F) above the air temperature. A cloudy 80° (F) day can warm the volatile tire turf to over 140° (F).

The “heat-island effect” inherent to crumb-rubber fields has already been undeniably proven to pose a separate risk of heat stroke to players, whereas the more insidious danger of carcinogen exposure has taken some time longer to prove conclusively. However, public reliance on industry assurances about the safety of poorly tested tire turf products could only artificially inflate the crumb-rubber market for so long before scientific testing systematically discredited the claims. The current consensus by leading scientific authorities acknowledges that tire turf, through both leeching and vaporizing, exposes players to dangerous levels of the neurotoxin lead, other neurotoxins and carcinogenic chemicals. A mounting library of scientific evidence produced by a vast array of credible researchers has demonstrated that the toxic side-effects of crumb-rubber fields represent a major public health hazard.

In return for a direct savings of approximately \$92,000 per field to owners (and unspecified sums to manufacturers), the decision to use this material over alternatives has transformed playing fields for children into toxic tire dumps. The preeminent authority charged with oversight of public health, the Centers for Disease Control (CDC), and the preeminent authority charged with oversight of Connecticut's law and order, the renowned Attorney General Richard Blumenthal, are devoting a considerable share of their vital resources to addressing the health threats of crumb-rubber artificial turf. As the crest of a rising tide of vociferous opposition to tire turf, the nation’s trend setters are assigning the tire-turf issue officially to the league of leading public health threats that includes infectious diseases.

Connecticut Attorney General Richard Blumenthal:

“Possibly treacherous turf is creating a clamor of questions that must be addressed. The federal government should investigate credible claims about toxic chemicals to confront environmental and public health dangers. Schools across the state are replacing grass fields with artificial turf made from recycled ground-rubber tires. Preliminary tests point to possible troubling health risks, including significant lead levels and carcinogens.”

Centers for Disease Control (CDC):

“Lead hazards in a child's environment must be identified and controlled or removed safely.”

“Age, weathering, exposure to sunlight, and wear and tear can cause lead dust to form on older or well-used artificial fields.”

RECOMMENDATIONS FOR ELIMINATING TREACHEROUS TURF

Like products containing asbestos, DDT, vinyl chloride and the numerous other poisonous industrial chemicals that were introduced by disreputable corporations and then recalled amidst a public health scandal, crumb-rubber fields are now the subject of rising investigations and moratoriums that auger an eventual ban on the product. Although the industry enjoyed a boom during the lax corporate regulation of the Bush Administration before extensive scientific studies clearly demonstrated the toxic hazards of the fields, **installations of the fields have now been outlawed in New York City and Los Angeles, along with a growing number of European countries.** Removals of badly contaminated fields have begun at a cost of \$1 million each. The state of California is currently suing a number of the turf manufacturers, including FieldTurf Tarkett, the maker of the field at Kingswood-Oxford school in West Hartford, CT.

As an urgent matter of public safety, playing fields must comply with existing regulations governing exposure to toxic chemicals. Based on the well-documented criticism of crumb-rubber turf by the scientific community and leading public health officials, the toxic hazards of these playing fields should be addressed by implementing necessary safeguards.

1. *Moratorium:* Construction of these fields should cease and existing fields should be closed and removed. A moratorium should also be placed on lawsuits related to this public health threat in order to facilitate implementation of the turf ban.
2. *Irrigation:* Prior to removal, owners of the toxic fields should be required to wet down the turf every thirty minutes on warm days to prevent overheating.
3. *Signs:* In addition, owners should be required to post signs:
 - a. Warning of the potential health hazards (Example: “This artificial playing field is a used tire repository storing the shredded remains of 20,000 tires. Dangerous levels of lead and multiple carcinogens can contaminate players either by inhalation or direct contact. Warm weather can magnify this toxic hazard and pose a separate risk of heat stroke to players. Play at your own risk.”), and
 - b. Citing the **recommendations by the CDC and Connecticut’s Attorney General** that players follow strict toxic decontamination protocols, including avoidance of drinking or eating on the field and aggressive body and clothes washing after field play.

TESTING: Interested parties can have local fields tested for toxins free of charge. Send samples to: The Center for Environmental Health, 528 61st Street, Suite A, Oakland, CA 94609. Also include your name, address, phone number, e-mail address and the turf’s manufacturer. You should receive a response within two weeks. Sample size: Up to eight square inches. Note: Take samples on a hot, windless day during a heat wave (a period without rain). Questions? Contact the center at (510) 594-9864.

SOURCES ARCHIVE (p. 9-37)

1. THE CENTERS FOR DISEASE CONTROL (CDC)
2. THE ENVIRONMENTAL PROTECTION AGENCY (EPA)
3. THE CONSUMER PRODUCT SAFETY COMMISSION (CPSC)
4. RICHARD BLUMENTHAL, CONNECTICUT ATTORNEY GENERAL
5. THE NEW YORK STATE DEPARTMENT OF HEALTH
6. THE STATE OF CALIFORNIA
7. THE NEW YORK TIMES
8. THE LOS ANGELES TIMES
9. USA TODAY
10. THE WALL STREET JOURNAL
11. THE NEW YORK DAILY NEWS
12. THE CHICAGO TRIBUNE
13. THE BOSTON GLOBE
14. CBS / NBC / ABC NEWS
15. FIELD TURF, a leading tire turf manufacturer (maker of the K-O field)
16. THE ASSOCIATION OF ARTIFICIAL GRASS INSTALLERS (ASGI)
17. NFL PLAYERS
18. NORTHWEST PARKS FOUNDATION
19. JOURNAL OF EXPOSURE SCIENCE AND ENVIRONMENTAL
EPIDEMIOLOGY
20. THE NEW JERSEY UNIVERSITY OF MEDICINE AND DENTISTRY
21. THE CENTER FOR ENVIRONMENTAL HEALTH (CEH), a CA nonprofit
22. ENVIRONMENT AND HUMAN HEALTH, INC. (EHH), a CT nonprofit
23. CT NEWS JUNKIE
24. THE LAS VEGAS SUN
25. LA REPUBBLICA
26. THE PROGRESSIVE KID READER
27. WEST HARTFORD NEWS
28. THE ECOLOGIST on tire dust
29. THE DEPARTMENT OF HEALTH AND HUMAN SERVICES – AGENCY FOR
TOXIC SUBSTANCES & DISEASE REGISTRY (ATSDR) on the health hazards
of chemicals found in tires
30. PBS NEWS, BILL MOYERS on the petro-chemical industry

Additional References

SUBJECTS

Note: Although this archive is categorized the SOURCES, readers can peruse a digital copy of the archive by these individual SUBJECTS (a sub-category) through the use of the “Find” function.

Health Hazards	/	Testing	/	Ingredients
Moratoriums	/	Benefits	/	Economics v. Public Health
Prominent Critics	/	Advocates	/	Recommendations
Lawsuits	/	Background		

THE CENTERS FOR DISEASE CONTROL (CDC)

- **Health Hazards:** For years, the CDC has called lead dust one of the biggest known health hazards to children and has funneled millions of dollars into efforts aimed at reducing it in the environment. The agency has said that age, weathering, exposure to sunlight, and wear and tear can cause lead dust to form on older or well-used artificial fields. Harmful levels of this dust could then be ingested or inhaled by people using the field. The CDC has long recommended “the elimination of all nonessential uses of lead” because of the potential health hazards it poses.
- **Recommendations:** The CDC [Health Advisory - June 18, 2008] has recommended posting toxicity warning signs on the lead-based fields that say:
 - **Body Wash:** After playing on the field, individuals are encouraged to perform aggressive hand and body washing for at least 20 seconds using soap and warm water.
 - **Clothes Wash:** Clothes worn on the field should be taken off and turned inside out as soon as possible after using the field to avoid tracking contaminated dust to other places. In vehicles, people can sit on a large towel if it is not feasible to remove their clothes. These clothes and towels should be washed separately. Shoes worn on the field should be kept outside of the home.
 - **No Eating or Drinking:** Eating while on the field or on turf product is discouraged. Avoid contaminating drinking containers with dust and fibers from the field. When not drinking, close them and keep them in a bag, cooler, or other covered container off the field.

<http://www.cdc.gov/nceh/lead/tips/artificialturf.htm>

http://www.boston.com/news/local/massachusetts/articles/2009/01/19/in_fake_grass_so_me_see_real_threat/

<http://www.synturf.org/ehhibrief.html>

THE ENVIRONMENTAL PROTECTION AGENCY (EPA)

- **Moratoriums:** The federal government is reconsidering whether sports fields and playgrounds made from ground-up tires could harm children's health after some Environmental Protection Agency scientists raised concerns, documents show. EPA scientists have urged their superiors to conduct a broad health study to inform parents on kids' safety.
- **Health Hazards:** EPA scientists are worried that they don't have enough information about potential health risks from chemicals in the rubber material

used to make artificial fields, which is popular because it decreases playground injuries and is low maintenance and weatherproof. Although the EPA for years has endorsed recycled-rubber surfaces, its own scientists now have pointed to research suggesting potential hazards from repeated exposure to bits of shredded tire that can contain carcinogens and other chemicals, according to internal EPA documents. An EPA spokesman says, "There is still considerable uncertainty over the possible exposure to hazardous substances including lead from synthetic turf."

- **Testing:** The concerns are disclosed in internal agency documents about a study the EPA is conducting of air and surface samples at four fields and playgrounds that use recycled tires. The study was prompted by other research suggesting potential hazards from repeated exposure to bits of shredded tire that can contain carcinogens and other chemicals, according to the documents. The EPA scientists cited gaps in scientific evidence, despite other reviews showing little or no health concern. Chemicals in recycled tires could vary by location because tire manufacturers differ, EPA scientists said. An EPA memo was sent to Washington from the Denver office in January 2008, saying that until more was known, the EPA should take a neutral stance instead of sanctioning recycled tires for play areas. The documents, obtained under the Freedom of Information Act, were provided to The Associated Press by the Public Employees for Environmental Responsibility, an advocacy group that objects to the EPA's endorsement of using recycled tires without a broad scientific risk evaluation. "It appears that there are valid reasons to take a broader perspective of all potential risks associated with crumb rubber" through a full-blown health study, said the memo from Assistant Regional Administrator Stephen Tuber. Connecticut asked the EPA to study the matter shortly after EPA's Denver regional office recommended the same.

<http://online.wsj.com/article/SB121200660381127079.html>

<http://abcnews.go.com/Politics/wireStory?id=7752300>

<http://www.msnbc.msn.com/id/31099900/>

THE CONSUMER PRODUCT SAFETY COMMISSION (CPSC)

- **Health Hazards / Testing:**
 - **Lead:** CPSC has stated that children can touch the surfaces and ingest lead dust - at the same time, the Centers for Disease Control issued advisories to parents and field managers to take precautions to reduce exposure. Lead can cause brain and neurological ailments.
 - **Other Toxins:** CPSC staff admits that aging, wear and exposure to sunlight may change the amounts of chemicals released by crumb-rubber turf. CPSC has not attempted to study or quantify the effects of those changes on health and safety. CPSC staff has not considered the

transferability or emission -- especially at high temperatures -- of toxic chemicals from the crumb rubber used at the base of the artificial turf. This crumb rubber is usually made from recycled tires, containing chemicals -- including benthothiazole, butyplated hydroxyanisole and phthalates -- that may be toxic or carcinogenic under some circumstances.

<http://www.ct.gov/ag/cwp/view.asp?Q=421480&A=2795>

<http://www.asgi.us/2009/07/artificial-grass-sports-field-safety-study-from-epa-preliminary-details-say-surfaces-are-safe/>

RICHARD BLUMENTHAL, CONNECTICUT ATTORNEY GENERAL

- **Background:** “Possibly treacherous turf is creating a clamor of questions that must be addressed. The federal government should investigate credible claims about toxic chemicals to confront environmental and public health dangers. Schools across the state are replacing grass fields with artificial turf made from recycled ground-rubber tires. Preliminary tests point to possible troubling health risks, including significant lead levels and carcinogens.”
- **Recommendations: Advice for minimizing toxic effects:** Attorney General Richard Blumenthal has suggested that parents in communities where synthetic turf fields were installed need to “manage the risk” by “addressing symptoms” and “reducing exposure on hot days.” He cautioned parents to take measures like hand washing and cleaning the clothing and skin of their children directly after they’d played on synthetic turf fields to reduce their exposure and limit their risk.
- **Testing: The Bush Administration v. Blumenthal, et al:** Criticism of the Bush Administration’s review of toxicity in artificial turf: Attorney General Richard Blumenthal today called on the Consumer Product Safety Commission (CPSC) to immediately remove and revise a report on its website that may dangerously and deceptively mislead citizens into believing that artificial turf has been proven safe. Blumenthal said the CPSC relied on a grossly inadequate and badly flawed study in declaring synthetic turf safe to install and play on -- focusing narrowly and insufficiently on lead, while failing to examine several other possible chemicals and concerns. This unconscionably deficient report is replete with unsound scientific methodology and conclusions, and unreliable findings. It may lead to unsupportable and unwise commitments by towns and cities or their boards of education to build or replace athletic fields. "The CPSC review of artificial turf safety focused entirely on the issue of lead contamination from artificial blades of grass. While this one issue is important, it is neither the sole nor the most significant issue. There is no indication that CPSC staff considered the transferability or emission -- especially at high temperatures -- of toxic chemicals from the crumb rubber used at the base of artificial turf. This crumb rubber is usually made from recycled tires, containing chemicals -- including benthothiazole, butyplated hydroxyanisole and phthalates -- that may be toxic or

carcinogenic under some circumstances. Similarly, there is no indication that CPSC considered other important risks, some presented or aggravated by very high temperatures in the summer sun, and exposure to serious infection caused by the more extensive skin burns and abrasions created by falls on this material. Further, while CPSC staff admits that aging, wear and exposure to sunlight may change the amounts of chemicals released, CPSC has not even attempted to study or quantify the effects of those changes on health and safety. Even as to the lead issue, the CPSC study is seriously and reprehensibly flawed. The study evaluated only 14 samples of artificial turf, even though thousands of these fields are in use. Worse, six samples were from portions of turf that was never installed or used, and one sample came from a field that was no longer in use. Thus, only half of the samples -- or seven -- were from turf in current use. The severely deficient scope of this fact finding eviscerates the credibility of CPSC's sweeping conclusions about thousands of artificial turf surfaces in daily use. It is mystifying and mindboggling that an agency charged with protecting our children from unsafe products would declare artificial turf 'OK to Install, OK to Play On' without studying these critical health and safety threats." The Connecticut Department of Environmental Protection (DEP) -- at Blumenthal's urging and with funding from a lawsuit settlement by his office -- is beginning a study of artificial turf. Blumenthal recommended that the CPSC coordinate additional study with the DEP to ensure a thorough and prompt examination of synthetic turf.

<http://www.ct.gov/ag/cwp/view.asp?Q=421480&A=2795>

http://www.ct.gov/caes/lib/caes/documents/publications/fact_sheets/examinationofcrumb_rubberac005.pdf

<http://www.synturf.org/thewestportbrief.html>

THE NEW YORK STATE DEPARTMENT OF HEALTH

- **Ingredients / Testing:** A field evaluation of chemical releases from synthetic turf surfaces was conducted at two locations. The results of this evaluation indicate a potential for release of zinc, aniline, phenol, and benzothiazole. The evaluation of volatile and semi-volatile organic compounds by offgassing proved difficult to conduct quantitatively due to the strong absorptive nature of the crumb rubber samples. A risk assessment for aquatic life protection performed using the laboratory SPLP results, found that crumb rubber derived entirely from truck tires may have an impact on aquatic life due to the release of zinc. The results of measurements may be different for fields of other ages or designs (e.g., different volumes of crumb rubber infill, non-crumb rubber infill) or for indoor fields.
- **Recommendations / Health Hazards: Heat:** The synthetic turf surface temperatures were much higher and prolonged contact with the hotter surfaces may have the potential to create discomfort, cause thermal injury and contribute to heat-related illnesses. Awareness of the potential for heat illness and how to

recognize and prevent heat illness needs to be raised among users and managers of athletic fields, athletic staff, coaches and parents.

http://www.dec.ny.gov/docs/materials_minerals_pdf/crumbrubfr.pdf

THE STATE OF CALIFORNIA

- **Moratoriums / Testing:** In response to numerous reports of excessive lead content and other health issues related to synthetic turf fields, the California Legislature passed SB 1277. This bill, authored by Senator Abel Maldonado (R-Santa Maria), will require the California Office of Environmental Health Hazard Assessment, in conjunction with the Department of Public Health and California Integrated Waste Management Board, to conduct a study investigating the health and environmental impacts of natural versus synthetic turf fields. “Thousands of children across the state play on these fields every day of the week. Recent studies conducted in New Jersey and across the nation indicate that there could be serious problems with these fields,” Maldonado commented. “Excessive levels of lead on some older fields in New Jersey prompted the closure of two fields. It is important that we know our children are using safe and healthy playing surfaces.”
- **Health Hazards:**
 - **Lawsuits:** The warning could read "Don't Roll on the Artificial Turf" if Atty. Gen. Jerry Brown and local law enforcement officials prevail in a lawsuit filed late Tuesday against three top makers of the green plastic playing fields and grass-like indoor-outdoor carpeting. The lawsuit, which has been joined by L.A. City Atty. Rocky Delgadillo and the Solano County Dist. Atty. David W. Paulson, names Beaulieu Group LLC of Georgia, AstroTurf LLC of Georgia and FieldTurf USA Inc. of Florida (the subsidiary of Canadian-owned FieldTurf Tarkett). Said Deputy Atty. Gen. Dennis A. Ragen, the state's lead attorney on the lawsuit against manufacturers of lead-based turf: "As it ages, it forms more dust, and could contain levels of lead that are more than 20 times what's allowed by Proposition 65. Most companies targeted by Proposition 65, known as the Safe Drinking Water and Toxic Enforcement Act of 1986, are eager to change their products rather than be forced to sell them with a warning that they contain chemicals "known to the state of California" to cause cancer or birth defects.” The state attorney general's office said it found excessive lead levels in some, but not all, of the artificial turf samples tested from the three companies.
 - **Testing:** The presence of volatile organic chemicals from these tires, as well as deadly bacteria that can remain on the synthetic grass blades, has prompted several states to take a closer look at potential negative impacts associated with these fields. Studies have shown that athletes who use

synthetic turf are seven times more likely to receive open skin lesions (referred to as turf burn). These open lesions are often the source of contracting and vehicle for spreading dangerous infections. In fact, a 2003 study of MRSA infections among St. Louis Rams football players found that all eight MRSA infections began at turf burn sites. Blood, sweat, skin cells and other materials can remain on the synthetic turf because the fields are not washed or cleaned. In short, playing on these fields is like playing on a giant used band aid.

http://www.sen.ca.gov/sfa/2008/_08_top.htm

<http://articles.latimes.com/2008/sep/04/business/fi-turf4>

<http://cssrc.us/web/15/news.aspx?id=5044>

<http://www.aboutlawsuits.com/california-artificial-grass-lawsuit-990/>

THE NEW YORK TIMES

Background: For more than a decade, New York has been replacing the grass or asphalt at dozens of its play spaces with synthetic material made from recycled tires, despite the safety concerns of some scientists and children’s advocates.

Moratoriums: The New York Parks Department is “suspending the use of rubber infill synthetic turf in all parks capital projects.” The city’s public advocate, Betsy Gotbaum, has questioned the safety of artificial turf, and on Tuesday reiterated her call for an “immediate moratorium” on its use.

Health Hazards:

Heat: Critics said synthetic material creates “heat islands” in the summer that can climb as high as 170 degrees because the surface absorbs sunlight and emits heat.

Carcinogens: Critics believe the turf can sometimes contain dangerous levels of metals and volatile organic compounds. At the heart of the dispute is whether synthetic turf, particularly crumb rubber fields made from recycled tires, places athletes at risk because of the presence of lead and polycyclic aromatic hydrocarbons (PAHs), which have caused cancer and organ damage in animals and may be a cancer risk to people if they are exposed over a long period. The question of how easily PAHs — which are also found in toys and other material — can be absorbed by the human body is a matter of dispute.

Recommendations: Geoffrey Croft, president of NYC Park Advocates, said the Parks Department should have studied the material in recycled tires long ago. “The fact that the city could not be bothered to conduct a single environmental study in ten years before spending more than \$150 million dollars speaks volumes. The city should have conducted a full environmental review before putting more than 30 million pounds of potentially hazardous chemicals into parkland. The city should instead be installing natural grass which cleans the air and filters out harmful particulate matter and provides a host of other environmental benefits.”

<http://www.nytimes.com/2008/01/23/nyregion/23turf.html>

<http://www.nytimes.com/2008/05/15/nyregion/15turf.html>

<http://cityroom.blogs.nytimes.com/2008/12/24/city-shuts-playground-over-lead-concern/?emc=eta1>

LOS ANGELES TIMES

- **Health Hazards:** Lead, which is used to give a natural green hue to the artificial turf, has been identified by state agencies as a chemical that can cause cancer, damage to male and female reproductive systems, and birth defects in developing fetuses. Children and other individuals playing on lead-based playing fields can ingest harmful levels of lead by absorbing it through the skin or by rubbing the ersatz grass and then touching food or their mouths. Although artificial turf presents little or no danger when it is new, lead levels rise to potentially harmful levels as it gets older. So contends California’s Attorney General in a lawsuit against manufacturers of the turf. *See above citation archive on “The State of California” for more LA Times coverage of this lawsuit.*
- **Moratoriums:** Even in the midst of a drought when water shortages are pressuring reductions in grass irrigation, Garden Grove is one of five cities in Orange County -- the others are Stanton, La Palma, Orange and Santa Ana -- that for years have barred residents from putting in fake lawns. Although most of the resistance has to do with the look of fake grass -- particularly the older imitations -- there have also been concerns over the lead levels in some artificial grass.

<http://articles.latimes.com/2008/sep/04/business/fi-turf4>

<http://articles.latimes.com/2008/aug/08/local/me-fakegrass8>

USA TODAY

- **Economics v. Public Health:** The other options for bases in artificial turf add thousands to a field's cost. “When you compare it to crumb rubber, the alternatives are quite a bit more expensive,” says Tim McMillan. “Tire companies were happy to get rid of crumb rubber because there's really no other

use for discarded tires. They almost gave it away. It costs \$92,000 more to install FlexSand compared to crumb rubber, but that expense is inconsequential when it comes to the health of field users. The health of our students is more important than any other issue. You should never equate economics with health. In no way should we be skimping on something like this that could affect our kids.”

- **Lawsuits:** The state of California is currently suing turf companies, including Field Turf (*Author’s Note: This is the maker of the tire turf field owned by Kingswood-Oxford school in West Hartford, Connecticut*). The companies stand accused of violating the lead-warning law by “knowingly and intentionally exposing individuals within the State of California to lead.”
- **Prominent Critics:** The head coach of the US soccer team wants FIFA to ban these artificial turf fields.
- **Moratoriums: New York City and Los Angeles are banning** artificial turf fields that use lead-based crumbs of recycled tire rubber as a base. Officials in the nation's two largest cities are not waiting out ongoing studies and debate about the safety of these fields that use crumbs of recycled tire rubber as a base. The New York City Department of Parks and Recreation and the Los Angeles Unified School District have decided that any new artificial fields they purchase must use a different material as its base, or infill, layer. Commissioner Adrian Benepe declared in April 2008 that all new fields would use alternatives to crumb rubber, mostly due to the fact new in-fills may be able resist heat better. The moves will mean using costlier alternatives such as one that uses coated grains of sand.
- **Background:** Darren Brandt, spokesman for industry-leader FieldTurf Tarkett, says of the roughly 3,000 Field Turf fields installed in North America, less than 10 use something other than crumb rubber for infill. So far, two fields installed in recent months have utilized used FlexSand — one of a half-dozen products on the market that doesn't use recycled tires.
- **Recommendations:**
 - **Warning Signs:** California Deputy Attorney General Dennis Ragen says he wants more than company officials' word that it won't happen in the future. Beyond banning the use of lead in future products, Ragen says he wants warnings posted near existing fields and a campaign that would educate field users to wash their hands to avoid ingestion of lead.
 - **Moratoriums:** Geoffrey Croft, president NYC Park Advocates, favors natural turf fields, but he said he's glad the city is moving away from crumb rubber. "We've been fighting against crumb rubber for years," he says. "We've wanted them to abandon it. Up until recently, they've refused. I hope they take crumb rubber out of all the fields."

http://www.usatoday.com/sports/2009-06-10-artificial-turf_N.htm

http://www.usatoday.com/sports/2008-09-02-turf-lawsuit_N.htm

http://www.usatoday.com/sports/soccer/2009-06-07-3886410144_x.htm

THE WALL STREET JOURNAL

- **Testing:** New Jersey State health officials last year and this spring found elevated levels of lead in several artificial turf playing fields, leading to closures.
- **Health Hazards:**
 - **Heat:** Another drawback of the artificial turf is it gets hot. According to Stuart Gaffin, a research scientist at Columbia University's Center for Climate Systems Research who studies artificial turf fields, artificial turf can get about 60 degrees (F) hotter than grass on hot and sunny days.
 - **Inhalation of Chemicals / Metals:** Parents and environmental advocates across the U.S. have also argued against the turf's installation citing health concerns. They worry about kids inhaling chemicals and traces of metals in the ground-up tires used as padding (the infill, the loose particles sprinkled into the faux grass after it is installed to help keep the blades upright and provide cushioning for players).

<http://online.wsj.com/article/SB121200660381127079.html>

THE NEW YORK DAILY NEWS

- **Moratoriums:** Crumb rubber has hit the road in New York City. The controversial material made from recycled tires will no longer be used in synthetic-turf fields for parks and schools, officials said yesterday. Work is scheduled to start later this month to resurface the (Thomas Jefferson Park) soccer field, City Parks Commissioner Adrian Benepe said. The replacement turf will have plastic-coated sand as infill, not crumb rubber. The fix will cost the city \$750,000 - money the department has in hand, Benepe said.
- **Health Hazards:**
 - **Inhalation of Chemicals / Metals:** Synthetic turf can burn your feet - and maybe dim your wits. The turf covering parts of a shut-down soccer field at Thomas Jefferson Park in East Harlem was found to contain five times more lead than the Environmental Protection Agency allows in playground soil, according to City Council members Eric Gioia (D-Queens) and Melissa Mark-Viverito (D-Manhattan, Bronx). Their statistics come from a report on a laboratory analysis done for the city

Parks Department prior to the field's closing in December. The lead-filled substance in the synthetic turf is crumb rubber, made from old tires.

- **Heat:** The turf also poses another danger: During hot weather, it can reach blistering temps of more than 165 degrees. Think it's hot running on a 90-degree day? Try running on a 150-degree track. During last week's sweltering temps, the turf reached temperatures in excess of 150 degrees, according to an infrared thermometer wielded by Geoff Croft, head of NYC Park Advocates and a longtime critic of the city's efforts to replace the parkland given to the Yankees for their new stadium. For comparison, Croft measured the temperature of a patch of natural grass near the park on the same day and found it to be only 84 degrees. Temperatures don't have to get into the 90s for the turf to overheat. Croft recorded similar readings of higher than 147 degrees on cloudy days when the air temperature never got higher than the low 80s.
- **Economics v. Public Health:**
 - **Socio-Economic Disparities:** The irony: This infestation of NYC's urban playgrounds with artificial turf and crumb rubber has been going on in the name of serving the underprivileged and urban youth, who, unlike the children of the well-to-do, do not get to go to the bucolic surroundings in the tri-State area or up-State, to camps where they can enjoy nature and natural grass playing fields. "You wouldn't let your children play in a junkyard, but many of the same chemicals are in this material," Gioia said.
 - **Financial Cost:** Removal of a single artificial field costs an estimated \$1 million per field.
- **Recommendations:** Activists and some legislators have called the fields potentially toxic and demanded removal.

http://www.nydailynews.com/news/2008/02/21/2008-02-21_schools_construction_project_nixes_use_o.html

http://www.nydailynews.com/ny_local/2009/02/08/2009-02-08_new_turf_battle_in_park_getting_lead_out.html

http://www.nydailynews.com/ny_local/bronx/2009/08/18/2009-08-18_macombs_park_turf_too_hot_for_them_to_handle_critics_thermometer_hits_150_degrees.html

http://www.nydailynews.com/ny_local/2009/02/09/2009-02-09_city_yields_ground_on_crumb_rubber_in_tu.html

THE CHICAGO TRIBUNE

- **Benefits:** A new generation of synthetic grass, made in part with ground-up rubber from used tires, has proven popular for schools and parks as a way to reduce maintenance costs and raise the usage of athletic fields. In addition to needing no mowing, it requires no watering, fertilizing or weeding. It also dries faster after rain and holds up to wear better than grass.
- **Health Hazards:** But in communities ranging from Connecticut to California, some environmentally conscious parents have raised questions about the fields, focusing on the potential for children to be exposed to toxins from used tires and to lead contained in the dyes used in many types of artificial grass.
- **Testing:**
 - **By an Independent Group:** The group called for a moratorium on new fields after a laboratory study it commissioned found that heated crumb rubber emits vapors containing at least four organic chemicals that can irritate eyes, skin and lungs, and one carcinogen.
 - **By European Nations:** These results corroborated assessments performed in Sweden, Norway and Italy, which concluded that the compounds found in recycled tires should not be used in synthetic turf until comprehensive research is done.

http://www.chicagotribune.com/features/lifestyle/green/chi-artificial-turf_swansonmay28,0,2658698.story

http://www.organicconsumers.org/articles/article_12558.cfm

THE BOSTON GLOBE

- **Background:** For two decades, state public health officials have waged a massive campaign to eliminate children's exposure to lead, yet some specialists are concerned that the toxic element may have found its way into schools in the form of artificial turf fields.
- **Ingredients:** Constructed of plastic and a simulated dirt made of discarded old tires, some fields contain lead in levels higher than communities anticipated.
- **Testing:**
 - **By New Jersey:** Problems with lead surfaced last year, when public health workers measuring run-off at a landfill in New Jersey found high lead concentrations in two playing fields nearby. Local officials closed both out of fear that athletes were swallowing or inhaling lead dust

emanating from worn plastic grass. In response to these test results, the Consumer's Union and the CDC called for additional testing of artificial turf fields.

- **By the Boston Globe:** The Boston Globe's testing found that lead was emitted by turf fields. The football field at Concord-Carlisle High contained nearly 300 parts per million lead in the Globe-commissioned test. The US Environmental Protection Agency's standard for bare soil in children's play areas is a maximum of 400 parts per million, though the US Centers for Disease Control and Prevention has long recommended "the elimination of all nonessential uses of lead" because of the potential health hazards it poses. "There's no safe level of lead; let's be clear on that," said Don Mays, senior director of product safety at the Consumer's Union, publisher of Consumer Reports. The American Academy of Pediatricians has also said there is no safe level of lead exposure and suggests that artificial fields should contain levels no higher than the trace amounts - 40 parts per million – found in soil.
- **By New York City:** An artificial turf field in East Harlem, N.Y., was slated for removal last month when local health officials determined it contained 500 parts per million lead.
- **Recommendations:** Suzanne Condon, Massachusetts associate commissioner for public health, said it's up to local officials to know what's in artificial turf before they buy it.
- **Additional References:**
 - **Consumer Reports:** All is not right with the synthetic playing fields. (December 2008)
 - **Journal of Exposure Science and Environmental Epidemiology** [editorial] says lead exposure from artificial turf fields is serious business. (November 2008)
 - **University of Medicine and Dentistry of New Jersey** says, "Lead in synthetic turf can be absorbed into gastric fluids". (September 2008)
 - **California** sues turf companies for violating lead warning law. (September 2008).

http://www.boston.com/news/local/massachusetts/articles/2009/01/19/in_fake_grass_so_me_see_real_threat/

CBS NEWS

Health Hazards: A Florida city official noted the city conducted tests that found that heavy rains and flooding would dislodge the rubber pellets used in landscape turf to make the artificial fibers stand up to appear more natural. He said the city was concerned that the pellets would get into the storm-sewer system and canals, and potentially threaten birds and fish. He also criticized the crumb-rubber turf for other potential environmental hazards. "There is heat gain, and this product does not produce oxygen as natural vegetation would."

<http://www.cbsnews.com/stories/2005/01/05/earlyshow/living/home/main664896.shtml?tag=contentMain;contentBody>

NBC NEWS

- **Testing:**
 - **New Jersey:** Two fields in New Jersey -- Frank Sinatra Park in Hoboken and a playing surface at the College of New Jersey in Ewing -- were voluntarily closed after state health officials detected what they said were unexpectedly high levels of lead in the synthetic turf, raising fears that athletes could swallow or inhale fibers or dust from the playing surface. Their testing had found up to 10 times the amount of lead that is allowed in soil on contaminated sites that are being turned into homes. A city-owned field in Newark was closed last fall after similar test results; officials there are replacing the surface.
 - **Connecticut and California:** Potential health concerns have led Connecticut and California to conduct their own studies on the health effects of turf. Connecticut asked the EPA to study the matter shortly after the EPA's Denver regional office recommended the same.
 - **Criticism of Past Testing:** Dr. Philip Landrigan, professor and chairman of community and preventive medicine at Mount Sinai School of Medicine in New York, wants a moratorium until more thorough studies are done. Some studies in the U.S. and Europe have assessed potential exposure and health risks for people using turf and concluded that health effects are unlikely. But Landrigan said he's aware of no studies that have evaluated how the chemicals affect actual children who play on turf field containing crumb rubber. "All those toxins are very available to kids, if kids are playing and running," he said. "All this chemical soup is going to get on their skins and their fingers."
- **Health Hazards:**

- **Lead:** "We have a great deal of interest in any consumer product that could potentially put children in harm's way because of lead exposure," Consumer Product Safety Commission (CPSC) spokesman Scott Wolfson said. New Jersey epidemiologist, Dr. Eddy Bresnitz, said fibers and dust created through wear and weathering might become airborne, where they could be inhaled or swallowed. Lead can cause brain damage and other illnesses, particularly in children.
- **Multiple Carcinogens:** As soccer players dribble, pass and shoot, their cleats kick up tiny bits of the ground-up rubber tires that are used as filler between the blades of artificial grass. That has some health experts, activists and parents from Seattle to Chicago to Stamford, Mass. worried that children may be exposed to chemicals if they inhale or swallow the rubber granules, known as crumb rubber. Some are calling for a moratorium until the issue is more fully studied. Rubber tires are made with chemicals that are known carcinogens. Communities from New Jersey to Oregon have raised concerns about children touching, swallowing or inhaling lead, metals and chemicals like benzene, zinc and breathable particles from synthetic fields and play yards.
- **Heat:** Heat also is a concern, raising the possibility of heat stress or heat stroke; temperatures on artificial turf fields have been recorded at 130 to 140 degrees, Professor Landrigan said.
- **Background:**
 - **Pervasiveness:** The United States has about 4,500 synthetic playing fields made of various materials, and about 800 are installed each year at schools, colleges, parks and stadiums, according to the industry's Synthetic Turf Council.
 - **Financial Cost:** Installation costs start at about \$300,000 and go up depending on the type of turf, the size of the field and other factors.
- **Benefits:** Artificial soccer, baseball and football fields are popular because they are easy on the bones, purportedly great for recycling, durable, weatherproof, and their low-maintenance qualities eliminate the need for watering, pesticides and mowing.
- **Ingredients:** Artificial turf is often made of fake blades of grass with sand or ground tires used as fill to provide a springy cushion. About 25 million used auto tires are recycled into turf each year, according to Synthetic Turf Council, the Atlanta-based trade group. Recycled tires contain metals such as zinc, plus toxic chemicals such as benzene and butadiene and polycyclic aromatic hydrocarbons, which also are contained in exhaust, smoke and soot (none of which are present in high concentrations on playing fields not made from tires).

- **Prominent Critics:**
 - **EPA:** The federal government is reconsidering whether sports fields and playgrounds made from ground-up tires could harm children's health after some Environmental Protection Agency scientists raised concerns about the potential hazards from repeated exposure to bits of shredded tire that can contain carcinogens and other chemicals.
 - **CDC:** A health advisory from the federal Centers for Disease Control and Prevention said older lead-based fields may be riskier for lead exposure as wear kicks up turf dust. The CDC urges eliminating all nonessential uses of lead, which can cause neurological damage in children.
 - **Connecticut State Representative:** Rep. Rosa DeLauro, D-Conn., who had criticized efforts by the Consumer Product Safety Commission (CPSC) and pressed the EPA for a comprehensive investigation, welcomed the environmental agency's role.

- **Recommendations:**
 - **Public Awareness:** EPA scientists urged their superiors to conduct a broad health study to inform parents on kids' safety.
 - **Toxic Decontamination Protocols:** Dr. Philip Landrigan suggested washing thoroughly after play, laundering clothes separately and wetting down fields to keep the dust and fibers down during play.

- **Moratoriums:** New York City officials say their new sports fields no longer will use tire crumbs.

<http://www.msnbc.msn.com/id/31099900/>
<http://www.msnbc.msn.com/id/30793416/>
<http://www.msnbc.msn.com/id/24204179/>

ABC NEWS

- **Background:** For years, the Environmental Protection Agency has endorsed the recycling of ground-up tires to cushion the surfaces of children's playgrounds and sports fields — the same material used for the Obama family's new White House playground. Now, the agency is having second thoughts. EPA scientists are worried that they don't have enough information about potential health risks from chemicals in the rubber material, which is popular because it decreases playground injuries and is low maintenance and weatherproof.

- **Health Hazards:** Communities from New Jersey to Oregon have raised concerns about children touching, swallowing or inhaling lead, metals and chemicals like benzene, zinc and breathable particles from synthetic fields and play yards . . . The scent of tire rubber wafted over the busy, five-field complex as a dozen third-graders flopped onto artificial turf infused with gravel-sized, black rubber. "We practice here, we eat lunch here (a violation of CDC protocols)," Arroyo said. "Everybody does that. It's a family park."
- **Moratoriums:** New York City officials say their new sports fields will no longer use tire crumbs.

<http://abcnews.go.com/Politics/wireStory?id=7752300>

FIELD TURF, the leading artificial-turf manufacturer (maker of the K-O field)

- **Ingredients:** A single artificial turf field with crumb rubber infill contains the pulverized remains of 20,000 tires.
- **Health Hazards:**
 - "Overall, the balance of the studies reviewed indicate that human health risks from playing on synthetic turf fields is minimal, even though low concentrations of some chemicals have been demonstrated to leach from the tire crumb, or volatilize as vapor."
 - *(Author's Note: The following statement is directly contradicted by the numerous documented cases of illness from tire turf included in this compilation of official government reports and mainstream news sources.)* There is not a single documented report of anyone, anywhere becoming ill as a result of exposure to, inhalation of, ingestion of, or contact with, artificial turf.
- **Advocates:**
 - **"New York City":** *(Author's Note: See the New York Times and USA Today citations above for a direct contradiction of this outdated statement trumpeted still by the turf manufacturer. New York City has since banned this product, as announced in April 2008 by the same official quoted below.)* New York City Parks and Recreation Department: "There is nothing inherently dangerous to these fields. There is a greater likelihood of head injuries in a fall than any danger from ingesting the rubber crumbs." (Commissioner Adrian Benepe, The New York Times)
 - **Kingswood:** Headmaster of Kingswood-Oxford high school: "We have researched the matter in great detail and have determined that the synthetic

turf in use at [Kingswood-Oxford School] does not pose an environmental threat or a health risk to the student-athletes and others who use it. We are aware of several independent studies, including one by Aliapur, the leading French government body responsible for used tires, along with ADEME, the French Agency for Environment and Energy Management that have offered proof that the rubber used in the installation of the field is not a danger to anyone." (Dennis Bisgaard, head of school at Kingswood-Oxford School, West Hartford News, November 29, 2007)

http://www.fieldturf.com/pdfs/SBR_Facts_TheIssues.pdf

THE ASSOCIATION OF ARTIFICIAL AND SYNTHETIC GRASS INSTALLERS

- **Moratoriums:** New York City parks officials recently said they will only purchase fields with fill made of sand or organics such as ground up walnut shells.
- **Testing / Recommendations:** In April 2008, New Jersey health officials issued an alert after finding elevated levels of lead dust coming from the pigment in two aging artificial-turf fields. Inspectors discovered the lead emissions in the Newark and Hoboken fields while checking air quality in those areas. Officials across the country abruptly closed dozens of nylon-turf fields to test for lead. Some posted warnings and discussed moratoriums. Over the past year, federal and state agencies have launched their own studies, and issued conflicting findings. School and municipal officials have reopened most of the fields, although safety questions have lingered. While the New York studies calmed fears, others conducted in California sounded alarms. New Jersey health officials continue to advise parents to make sure children scrub well after playing on the fields. "The recommendations are still in force," said Donna Leusner, spokeswoman for the New Jersey Department of Health and Senior Services. (dated July 2009)
- **Health Hazards:** The Consumer Product Safety Commission stated that children can touch the surfaces and ingest lead dust - at the same time, the Centers for Disease Control issued advisories to parents and field managers to take precautions to reduce exposure. Lead can cause brain and neurological ailments.

<http://www.asgi.us/2009/07/artificial-grass-sports-field-safety-study-from-epa-preliminary-details-say-surfaces-are-safe/>

NFL PLAYERS

- **Prominent Critics:**
 - **Most NFL Players:** The 2006 NFL Players "Playing Surfaces Opinion Survey" concluded that professional football players prefer grass over synthetic turf.
 - **Top Quarterback Tom Brady:** Tom Brady's Super-Bowl-altering ankle injury has been blamed on artificial turf. The Boston Globe reported that Brady may have injured his ankle in a series of mishaps during the AFC Championship game [January 20, 2008] against the San Diego Chargers. "His cleat got caught." - *Author's Note: These artificial turf manufacturers may have also robbed the New England Patriots of the most perfect season in NFL history.*

http://www.boston.com/sports/football/patriots/articles/2008/01/24/jaworski_hits_on_injury_time/

http://www.synturf.org/images/2006_NFLPA_Players_Playing_Surface_Survey.pdf

NORTHWEST PARKS FOUNDATION

Ingredients: UV rays break down the surface of a crumb rubber field and it must be replaced every ten years. Manufacturers only guarantee the fields for eight years.

http://www.ci.wellesley.ma.us/Pages/WellesleyMA_SpragueResources/Athletic%20Field%20Surfaces%20in%20the%20Pacific%20Northwest.doc

JOURNAL OF EXPOSURE SCIENCE AND ENVIRONMENTAL EPIDEMIOLOGY

Background: Many synthetic turf fields consist of not only artificial grass but also rubber granules that are used as infill. The public concerns about toxic chemicals possibly contained in either artificial (polyethylene) grass fibers or rubber granules have been escalating.

<http://www.nature.com/jes/journal/vaop/ncurrent/abs/jes200855a.html>

THE UNIVERSITY OF MEDICINE AND DENTISTRY OF NEW JERSEY

Health Hazards: Lead in synthetic turf can be absorbed into gastric fluids: A new study by researchers at the UMDNJ-School of Public Health finds that when children or athletes ingest the tiny rubber granules in synthetic turf, it is likely that a significant

portion of the lead in the granules will be absorbed by their bodies' gastric fluids. Because we know that even low levels of lead can cause neuro-cognitive problems – such as IQ loss – in children, these absorption fractions are meaningful.

<http://www.umdnj.edu/cgi-bin/cgiwrap/quinnaj/newsroom.cgi?month=09&day=16&year=08&headline=UMDNJ+Study+Finds+Lead+in+Synthetic+Turf+Can+Be+Absorbed+into+Gastric+Fluids>

THE CENTER FOR ENVIRONMENTAL HEALTH (CEH), an Oakland-based consumer watchdog group

- **Testing:**
 - **By CEH:** CEH has commissioned independent testing to determine if lead from turf wipes off on contact. A test result on one sample showed that a single wipe of a child's hand on the turf could, if the child then wiped her hand on her mouth, suffer a lead exposure in violation of California law. In every case, samples tested by the laboratory show that when turf contains high amounts of lead, the lead wipes off at levels that exceed California standards. Recent reports have found high lead levels in turf on artificial turf playing fields, but the CEH testing shows that artificial grass used by residential installers and sold to do-it-yourselfers can also be a health threat.
 - **On Field Turf** (maker of the K-O field): Testing shows high lead levels in turf from Field Turf. The testing found that the lead level in one turf sample, produced by the nation's leading installer of sports fields, Field Turf, was 150 times higher than federal limits that will ultimately come into effect as a result of recent Congressional action to ban lead in products for children. Testing conducted for the Oregon Statesman Journal on a high school sports field installed by Field Turf found lead levels far in excess of federal and California standards.
 - **The Bush Administration v. CEH, et al:** In July 2008, the Bush Administration's Consumer Product Safety Commission released an assessment that claimed to find no lead threat from artificial turf, even though their testing found that lead can come off of turf at a level that is almost twenty times higher than the California standard. CPSC looked at only fourteen samples from four companies; to date, CEH has tested over 150 samples from more than two dozen companies, and has found about 30% of the samples contain high lead levels. Last month, Connecticut Attorney General Richard Blumenthal called the CPSC assessment "crudely cursory" and requested that the agency withdraw its report. The CEH is disappointed but not surprised that the Bush CPSC released this flawed analysis of the dangers to children from artificial turf. After CEH

found other lead threats to children, including high levels of lead in vinyl baby bibs and vinyl children's lunchboxes, CPSC released similar manipulated test data and misleading statements about the safety of these products. -- *Author's Note: See CTAG Blumenthal's citation for a detailed rebuttal of the Bush Administration's CPSC report on artificial turf.*

- **Health Hazards:** Children can also be exposed when turf degrades in the sun and releases lead-tainted dust. Lead is a neurotoxin that can cause learning disorders, brain and nerve damage, hearing problems, stunted growth, and digestive problems. Scientists are increasingly concerned that there is no safe level of lead exposure, especially for young children.
- **Lawsuits:**
 - **By CEH:** The CEH filed a legal action with the state of California demanding that 15 retailers and manufacturers cease selling and producing artificial turf containing lead — a potent neurotoxin. The nonprofit is calling for turf makers to reformulate their products to eliminate the lead risk to children.
 - **By California:** The California Attorney General, the Los Angeles City Attorney and the Solano County District Attorney have filed suit against three of the turf producers, including Field Turf, identified by CEH.
- **Recommendations:**
 - **“Grassroots” Testing:** The nonprofit is also announcing that parents, schools or others with artificial turf fields can send samples of turf for free lead testing to the nonprofit’s Oakland office. "Send samples to: The Center for Environmental Health, 528 61st Street, Suite A, Oakland, CA 94609. Include your name, address, phone number and e-mail address. Information about the turf -- where purchased, brand name, etc., is helpful. Send a sample up to eight square inches in size, although smaller sample sizes will suffice. You should receive a response within two weeks. Contact the center at (510) 594-9864 for additional questions."
 - **Hand-Washing:** Echoing the CDC, the CEH is recommending that parents and schools be sure that children wash their hands thoroughly after playing on artificial turf fields.

http://www.ceh.org/press-releases/eliminating-toxics/legal-action-launched-on-lead-in-artificial-turf/index.php?option=com_content&task=view&id=311&Itemid=166

http://www.ceh.org/press-releases/eliminating-toxics/legal-action-launched-on-lead-in-artificial-turf/index.php?option=com_content&task=view&id=299&Itemid=166

http://www.ceh.org/press-releases/eliminating-toxics/legal-action-launched-on-lead-in-artificial-turf/index.php?option=com_content&task=view&id=325&Itemid=166

ENVIRONMENT AND HUMAN HEALTH, INC. (EHH), a Connecticut-based nonprofit group

- **Health Hazards:**
 - **Ingredients:** Rubber tires contain toxic chemicals and heavy metals.
 - **Grinding Effect:** When you grind up these tires the chemicals and heavy metals do not disappear.
 - **Crumb Dispersal:** The tiny particles of the ground-up rubber tires get into children's hair, ears, noses, shoes and socks when they play on these fields.
 - **Crumb Dust:** These ground-up rubber tires have a lot of crumb-rubber dust that is created when they are on the fields. The dust contains the same chemicals as the tires -- only now the dust is so small in size that it is capable of being breathed in deep into the lungs.
 - **Manufacturer Claims:** People are asked by the synthetic turf manufacturers to assume that the amount of exposures from the rubber crumbs - as well as exposures from the rubber crumb dust - are insufficient to produce any health effect, irrespective of the age of the child or the number of hours, days or years that a person plays on these fields. Those who promote the safety of these fields provide no measurements in which to support these assumptions.
 - **Health Effects:** According to an EHH study, the toxic actions of concern from the materials that were released from recycled crumb rubber include severe irritation of the respiratory system; severe irritation of the eyes, skin and mucous membranes; systemic effects on the liver and kidneys; neurotoxic responses; allergic reactions, cancers; and developmental effects.
 - **Summary:** In terms of weight, there are more than 100 tons of ground-up rubber tire crumbs on each field. There is no barrier between the rubber crumbs and the athletes playing on the fields. The rubber crumbs are unstable and attach to those who play on the fields. Dust particles from these crumbs are easily inhaled. It is clear that children will be exposed to these rubber crumbs, their dusts and their vapors on these fields.
- **Health Hazards of Tire Ingredients:** Corroborating information from the rubber industry: From the information that is available, it was found that tire crumbs contained volatile organic hydrocarbons (VOCs) with carcinogenic potential, which could be extracted from the crumbs in the laboratory. Health reports from workers in the rubber fabrication industry and in the rubber reclamation industry

describe the presence of multiple volatile organic hydrocarbons, semi-volatile hydrocarbons and other toxic elements in the air. Studies at tire reclamation sites report the leaching of similar sets of chemicals into the ground water. Occupational studies document a spectrum of health effects ranging from severe skin and eye irritation and respiratory irritation to three forms of cancer. The relationship between exposures to the rubber workers and those experienced by people using athletic fields or children in playgrounds covered with ground-up rubber tire material is not known, but we do know that many of the same chemicals that rubber workers are exposed to are being released from the ground-up rubber tire crumbs.

- **Testing by EHH:**

- **Vapors:** It found organic compounds vaporizing from tire crumbs, consisting mainly of benzothiazole, butylated hydroxyanisole, n-hexadecane and 4-(t-octyl) phenol.
- **Leaching:** It found the elements zinc, selenium, lead and cadmium to be among the main substances that leach into water from crumb rubber.
- **Summary:** The laboratory data presented here support the conclusion that under relatively mild conditions of temperature and leaching solvent, components of crumb rubber produced from tires (i) volatilize into the vapor phase and (ii) are leached into water in contact with the crumbs.
- **Chemical Process:** The chemical process that results in lead deposits on artificial playing fields: EHH released a research report about the toxicity of crumb rubber in artificial turf fields. The testing was done by the Connecticut Agricultural Experiment Station (CAES). The study examined how exposures can occur from lead in synthetic turf. “Lead has been found in the synthetic turf grass mat used in artificial athletic fields. Although the lead is incorporated into the turf, it is oxidized and released when exposed to a solution that is acidic. Water that condenses out of the air as dew or in humid conditions is acidic due to the absorption of carbon dioxide from the air. The acidic solution causes the lead in the product to be oxidized to lead oxides and carbonates which are very soluble. The soluble lead salt forms a layer on the surface of the product. Similarly, washing out a pot that contains lead glaze does not render it safe because glaze continues to release lead when acidic juices are stored in it. The surface of the fields seems to be doing the same thing. Over time, soluble lead collects on the surface of the field. When it rains the lead is washed off but a few days later more lead is oxidized and it is again on the surface. Activity on the field will release the lead into the air. Exposure is not dependent on the content of lead in the product but the amount of oxidation that has occurred. This same process takes place on houses painted with lead-based paint. The soil around the houses is contaminated

with lead that has been washed off of the houses by rain over time. The exposures to players and to the soil and the run-off water will continue as long as the lead-based products are present. This could be a human exposure problem.”

- **Corroborating Study:** A 2006 Rutgers University study of tire crumbs taken from synthetic turf fields in New York City identified six polycyclic aromatic hydrocarbons (PAHs) at levels that reportedly exceeded the regulatory levels in New York State. These six compounds are highly likely to be carcinogenic to humans.
- **Moratoriums:** Banned in European countries: Norway, Sweden and now Italy have recommended that there be no further construction of fields with rubber tire crumbs in their countries.
- **Recommendations:** "There is enough information now concerning the potential health effects from chemicals emanating from rubber tire crumbs to place a moratorium on installing any new fields or playgrounds that use ground-up rubber tires until additional research is undertaken."

<http://www.ciwmb.ca.gov/Publications/Tires/62206013.pdf>

<http://www.synturf.org/thewestportbrief.html>

<http://www.synturf.org/ehhibrief.html>

<http://www.synturf.org/lead.html>

<http://www.ehhi.org>

CT NEWS JUNKIE

Health Hazards / Ingredients: The problem with crumb rubber is that the recycled rubber tires from which it is made are known to contain heavy metals, carcinogens and intoxicants, such as benzene and carbon black. Environmentalists say this may mean increased risk, especially small children. There is also the potential for air and groundwater pollution. “Those chemicals don’t go away just because your grind [the tires] up.” About 40,000 rubber tires are used in just one synthetic field according to Field Turf, an artificial turf company.

http://www.ctnewsjunkie.com/environment/crumb_rubber_safe_cushion_or_h.php

THE LAS VEGAS SUN

Health Hazards: Other universities have found that the crumb-rubber turf needs to be irrigated every 30 minutes to keep it cool enough to play on.

<http://www.lasvegassun.com/news/2009/jan/15/fake-grass-has-drawback-it-gets-too-hot-study-says/>

LA REPUBBLICA

Testing / Health Hazards: As his last act in office, former Italian Minister of Health Francesco Storace made public the study of a commission that he had set up in order to examine the potential risks associated with use of rubber in artificial turf fields. According to the study, the synthetic turf fields in Italy are potentially cancer-causing. The study found levels of polycyclic aromatic hydrocarbons (PAHs), toluene (volatile toxic compound), and heavy metals to be higher than the legal limits. The PAHs pose risks to kidneys, liver, and lungs. According to the investigators at the High Institute of Health (Istituto superiore di Sanita), the inhalation of the dust from these substances poses a risk to soccer players. The commission, which also included physicians and lawyers from the ministry of the Environment, urged the adoption of a law to clean up the dangerous fields. According to Professor Roberto Verna, the president of the commission, "It is clear that PAHs and toluene are a danger to health. We do not want to spread fear, but it is necessary to find a way to clean up the playing fields," he said. "This study is the first such work in Europe that has been undertaken by an independent commission."

<http://www.repubblica.it/2006/04/sezioni/cronaca/campi-sintetici-cancerogeni/conferma-rischi-cancro/conferma-rischi-cancro.html>

THE PROGRESSIVE KID READER

- **Health Hazards:**
 - **Carcinogens:** The polycyclic aromatic hydrocarbons (PAH) of greatest concern is benzopyrene, which was found on the artificial turf. This chemical has been linked to half of all human cancers and up to 70 percent of lung cancers.
 - **Rubber Decomposition:** The Field Turf website describes its product as having "Guaranteed resistance to sunlight (Ultra Violet radiation degradation). Resistant to rot, mold, mildew, foot traffic, hydrolysis, airborne contaminants and microbial attack." But in her report "The Myth of Rubberized Landscapes", Linda Chalker-Scott, Extension Horticulturist and Associate Professor at Washington State University, cautions against this optimistic assessment of the permanence of rubber pellets: "Far from being permanent, rubber is broken down by microbes like any other organic product." If the rubber can be degraded, it can enter the water supply.

- **Inhalation:** According to the Department of Health and Human Services Agency for Toxic Substances & Disease Registry (ATSDR), it also can readily evaporate into the air from soil or surface waters. And that means it can be inhaled. Alison J. Draper, an assistant professor of chemistry at Bucknell University in Pennsylvania, studied the effects of tire decomposition. In her study, Draper left finely ground tire particles in water samples for ten days. All the aquatic organisms in her water samples died, including algae, suggesting strongly that aquatic communities could be gravely affected by tire runoff. The ATSDR agrees that certain PAHs can leach from the soil to contaminate underground water. Draper believes there is also the potential for asthmatic and/or allergic reactions to rubber pellets. She explains, “We’re only at the very beginning of that investigation. But, given the chemicals in tire rubber and given how readily they leach out, we can expect a respiratory response [in human beings].”
- **Summary:** In the case of artificial turf, plenty of scientific evidence has shown that it is hazardous in at least three significant ways: it harbors bacterial infection, it exposes humans and animals to carcinogens, and it contaminates aquifers and drinking water.

<http://www.progressivekid.com/reader/index.php/home-turf-disadvantage/>

WEST HARTFORD NEWS

- **Health Hazards / Testing:** Nancy Alderman is president of the nonprofit group Environment and Human Health (EHHI), which recently released a report on why the rubber tire crumbs found in most synthetic fields emit harmful gasses. According to Alderman, many of the new synthetic fields are made from a synthetic, grass-like material to which large amounts of ground-up rubber tire crumbs are added as in-fill. It is the out-gassing from these ground-up rubber tire pellets that is of greatest concern. According to the report found on the EHHI Web site, "the Connecticut Agricultural Experiment Station study conclusively demonstrates that the tire crumbs and tire mulch release chemical compounds into the air and ground water. Thus, tire crumbs constitute a chemical exposure for humans and the environment. It is clear the recycled rubber crumbs are not inert, nor is a high temperature or severe solvent extraction needed to release metals, volatile organic compounds or semi-volatile organic compounds. The release of airborne chemicals and dust is well-established by the current information. The Connecticut Agricultural Experiment Station research conclusively demonstrates that release can occur under ambient conditions experienced in the summer in Connecticut. The report stated that exposure to lungs, skin, and eyes could be harmful. The report also acknowledged that "knowledge is somewhat limited about the effects of semi-volatile chemicals on the kidney, endocrine system,

nervous system, cardio-vascular system, immune system, developmental effects and the potential to induce cancers."

- **Advocates:**
 - **Kingswood-Oxford School:** "Kingswood-Oxford School is aware of the stated concerns about crumb rubber," said Dennis Bisgaard, head of school at Kingswood-Oxford School. "We have researched the matter in great detail and have determined that the synthetic turf in use at K-O does not pose an environmental threat or a health risk to the student-athletes and others who use it."
 - **Simsbury High School:** Simsbury High School Athletic Director John Domainque said any harmful gasses are only emitted when the synthetic field is exposed to 140 degrees of heat in a clinical setting (*which can occur on used fields when the outside air temperature is 80° (F).*) "We don't play in the summer," he said. "We water the field down on hot days."

West Hartford News, Nov 29, 2007

[http://www.zwire.com/site/news.cfm?](http://www.zwire.com/site/news.cfm?newsid=19069135&BRD=1646&PAG=461&dept_id=11035&rft=6)

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THE ECOLOGIST on tire dust

- **Health Hazards:**
 - **Inhalation:** Particulate matter is a very insidious form of air pollution and tires contribute significantly to this form of pollution. Several studies published in the last decade have demonstrated that about 60 percent of these fragments are so small that they can enter the very deepest parts of the human lung.
 - **Allergies:** In addition to generalized allergic responses, tire dust also produces some very specific allergic responses.
- **Ingredients:** Tires are made from a combination of natural latex, derived from rubber trees, and synthetic rubber derived from petroleum. To form the rubber into hard-wearing vehicle tires, manufacturers use an extensive range of chemicals including xylene, benzene, petroleum naphtha, chlorinated solvents (for example 1,1,1- trichloroethane), polycyclic aromatic hydrocarbons, anthracene, phenanthrene, benzo[a]pyrene, phenols, amines, oil, acids and alkalis (eg sodium hydroxide), polychlorinated biphenyls, halogenated cyanoalkanes, processing aids, and plasticizers. Tire processing also involves several heavy metals including zinc, cadmium, lead, chromium and copper.

- **Testing:** The unique combination of known carcinogens, neurotoxins, heavy metals and other poisons in tire dust has been linked to serious diseases by numerous studies.
 - **Annual Reviews of Public Health:** In a 1994 report on the adverse effects of particulate air pollution, published in the Annual Reviews of Public Health, researchers found that for every cubic meter of air, an increase of 20 micrograms (mcg) of particulate matter meant a one per cent increase in deaths from all causes. In this study deaths from respiratory failure, but also heart failure, were much more common as particulate levels increased.
 - **Health Effects Institute:** This estimate is echoed in the conclusions of a recent report by the non-profit Health Effects Institute in Cambridge, Massachusetts, which found that death rates in the 90 largest US cities rise by 0.5 percent with only a tiny increase – 10 mcg per cubic meter of air – in particles less than 10 micrometers in diameter. However, these findings may underestimate the real risk.
 - **Journal Epidemiology:** This month a large, long-term study of Los Angeles residents, published in the journal Epidemiology, found that for each increase of 10 micrograms per cubic meter of fine particles in the neighborhood’s air, the risk of death from any cause rose by 11 to 17 percent. The risk of death from diabetes rose more than two-fold and the risk of death from heart disease rose by an astounding 25 to 39 percent.
 - **Journal of the American Heart Association:** Similar findings were published in 2003 in the Journal of the American Heart Association, where researchers looking at 16 years of data on more than a million people concluded that long-term exposure to air pollution posed a greater risk of death from heart disease than it did for death from respiratory ailments.

*http://www.theecologist.org/archive_detail.asp?content_id=543
<http://www.synturf.org/rubbercrumbtoxic.html>*

**THE DEPARTMENT OF HEALTH AND HUMAN SERVICES –
 AGENCY FOR TOXIC SUBSTANCES & DISEASE REGISTRY (ATSDR) on the
 health hazards of certain chemicals found in tires**

Health Hazards: “Some people who have breathed or touched mixtures of polycyclic aromatic hydrocarbons (PAHs) and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).” PAHs can readily evaporate into the air from soil or surface waters.

<http://www.progressivekid.com/reader/index.php/home-turf-disadvantage/>

PBS, BILL MOYERS on the petro-chemical industry

Health Hazards: Continuing unabated since the 1950s, the petro-chemical industry has been polluting American neighborhoods with poorly tested toxins. While some of the industrial chemicals are inert, many are known hazards, like the lead and other carcinogens in tires. "We're conducting a vast toxicological experiment, and we're using our children as the experimental animals." Like the cigarette industry, the petro-chemical industry has a long history of conspiring to conceal from the public the harmful health effects that these compounds have on people.

Trade Secrets, A Moyers Report, PBS, March 26, 2001

<http://www.pbs.org/tradesecrets/>

<http://www.pbs.org/tradesecrets/transcript.html>

ADDITIONAL REFERENCES

For a list of faulty reasons why people use crumb-rubber turf, see:

<http://www.pkonaledge.com/2007/11/04/eight-potential-pitfalls-of-parentthink-home-turf-disadvantage-ii/>

For further information on lead exposure from the CDC, see:

<http://www.cdc.gov/nceh/lead/tips.htm>

<http://www.cdc.gov/nceh/lead/publications/books/plpyc/chapter8.htm>

<http://www.atsdr.cdc.gov/toxprofiles/phs13.html>

For a cross-comparison of the various types of artificial turfs, see:

http://www.ci.wellesley.ma.us/Pages/WellesleyMA_SpragueResources/Athletic%20Field%20Surfaces%20in%20the%20Pacific%20Northwest.doc

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