

The image features a dense, vibrant green artificial grass texture. A horizontal white stripe, resembling a yard line on a football field, runs across the middle of the frame. The text 'FEAR VS.' is centered on this stripe. 'FEAR' is in black, 'VS.' is in yellow, and a period follows 'VS.'.

FEAR VS.



On afternoons across the country, kids pull on their soccer, baseball, and lacrosse uniforms and take to the field. Some come home with grass stains, but on more than 12,000 fields in the United States, kids come home with bits of rubber stuck to their shoes from crumb rubber synthetic turf infill.

Synthetic turf fields are becoming more common, in part because they tend to have greater durability and lower maintenance costs compared with grass. In North America, about 98 percent of synthetic turf fields use granulated recycled tire rubber, or crumb rubber, as infill. The granules fill in the space between synthetic blades of grass to provide cushioning, aid drainage, and help prevent injuries when athletes run, slide, or take a tumble. Yet even as these fields become more common, some community members have raised

skin comes in contact with the crumbs. Other research has considered whether crumb rubber releases harmful levels of chemicals into the air. None of the studies have found evidence that the material is harmful.

● A 2013 study by researchers at the Rutgers Robert Wood Johnson Medical School in New Jersey evaluated opportunities for exposure to trace metals, semi-volatile organic compounds, and polycyclic aromatic hydrocarbons from crumb rubber infill and the artificial turf fiber “grass.” Researchers measured these factors in simulated body fluids representing digestive fluids, lung fluids, and sweat. The researchers found that PAHs were routinely below detection limits, and SVOCs that have environmental regulatory limits were at levels too low to quantify. Some metals were detected, but researchers said the concentrations were low and likely would

FACTS

WHAT WILL IT TAKE TO ALLAY THE PUBLIC'S CONCERNS ABOUT THE SAFETY OF CRUMB RUBBER INFILL ON SYNTHETIC TURF FIELDS?

BY MEGAN QUINN

questions about whether crumb rubber is safe.

On one side of the conflict are more than 70 studies and literature reviews from state health departments, universities, and other independent entities in the United States and in Europe. None of the studies say crumb rubber is a public health or environmental concern. On the other side are environmental groups and residents who worry that various chemicals in tire rubber could cause cancer or other health problems, and they are asking school boards, cities, and states to ban crumb rubber infill. Tire processors and synthetic turf vendors are concerned that this fear has trumped the facts and maligned a product with real environmental benefits.

WHAT THE STUDIES SAY

Over the years, numerous organizations have looked into crumb rubber's potential health and environmental risks. Studies have examined several factors, such as how crumb rubber affects the human body when it is ingested or when athletes'



RESOURCES FOR RUBBER RECYCLERS

Educate the public and your customers when they have questions or concerns about crumb rubber's safety by taking the following actions:

- **Read and share the research.** ISRI and partners such as the Recycled Rubber Coalition, Safe Fields Alliance, and Synthetic Turf Council are working together on a public awareness campaign about the benefits and safety of recycled crumb rubber. A new website has links to research, Q&As, pamphlets, presentations, videos, and other resources. Visit www.recycledrubberfacts.org.
- **Get involved.** Attend local council meetings or other public meetings where communities are debating the topic to make your voice heard. ISRI can provide materials you can use to inform the public on this important issue. Contact Mark Carpenter, ISRI's senior director of media relations and online communications, at markcarpenter@isri.org or 202/662-8525.
- **Attend a workshop at ISRI2016.** Carpenter and other speakers will host a workshop at this year's convention for recyclers and other stakeholders on dispelling myths and responding to questions you might get from customers about crumb rubber. The workshop is 11:30 a.m. on April 6 at the Mandalay Bay Resort & Casino in Las Vegas. Visit isri.convention.org.

not cause health problems. "The study demonstrated that for the products and fields we tested, exposure to infill and artificial turf was generally considered de minimus," it stated.

- A May 2008 literature review by TRC (Windsor, Conn.) for the New York City Department of Health and Mental Hygiene evaluated 11 previously conducted human health risk assessments of crumb rubber in artificial turf. Each assessment looked at different crumb rubber constituent materials, but "all had a similar conclusion: exposure to [chemicals of concern] may occur, however the degree of exposure is likely to be too small through ingestion, dermal [contact], or inhalation to increase the risk for any health effect."

- In 2009, four Connecticut state agencies (University of Connecticut Health Center, the Connecticut Agricultural Experiment Station, the Department of Public Health, and the Department of Environmental Protection) evaluated the health and environmental impacts associated with crumb rubber turf fields in Connecticut. Researchers looked at four outdoor fields and one indoor field, asking three soccer players at each field to wear personal monitoring devices to collect samples. The study tested about 200 chemicals at each field. Researchers concluded that there were no elevated health risks from playing on the indoor and outdoor fields, but they noted that indoor fields may need ventilation because of higher levels of chemicals at the one indoor field they tested. The Connecticut Academy of Science

and Engineering peer-reviewed the findings.

- In 2013, ChemRisk (Pittsburgh) conducted a literature review for the Rubber Manufacturers Association (Washington, D.C.) to evaluate the health and ecological risks associated with the use of recycled tire rubber on playgrounds and athletic fields. While some of the ingredients used in tire manufacturing are considered to be "potentially hazardous to human health at high doses, the potential for athlete or child exposure to these chemicals is very low" when playing on a synthetic turf field, the study says. It notes that heating during the tire manufacturing process causes physical and chemical reactions that bond potentially harmful chemicals into the material, and "the process is designed so the release of chemicals into the environment is inhibited." After reviewing research from both advocates and opponents of crumb rubber, ChemRisk concludes that "no adverse human health or ecological health effects are likely to result from [the] beneficial reuses of tire materials," but it adds that additional scientific studies will help supplement and confirm the studies that have already been done.

MORE STUDIES IN THE WORKS

The U.S. Environmental Protection Agency did a study in 2008 about synthetic turf fields, but officials say it was to test a method for measuring possible emissions from synthetic turf, not to determine possible health risks. The EPA says it "supports more comprehensive efforts to identify potential exposures to tire crumbs and better assess risks," and it announced in February that it would participate in a joint study with the Centers for Disease Control and Prevention and the Consumer Product Safety Commission to further study possible health risks related to crumb rubber used on turf fields. The study aims to identify gaps in the current knowledge, characterize chemical compounds found in crumb rubber, evaluate possible risks, and involve stakeholders such as parents, athletes, and coaches, the EPA says. The agencies say they will have the first status report on the study by the end of 2016.

In addition to the abovementioned studies, the state of New Jersey has looked at the issue, as have the Consumer Product Safety Commission and the Agency for Toxic Substances and Disease Registry. "All of these studies did not show elevated health risk from playing on fields with synthetic turf or tire crumb. However, they do not comprehensively address new questions

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and concerns about children's health risks from exposure to crumb rubber," the EPA says in a statement.

Crumb rubber proponents and opponents alike are following the progress of an ongoing study from the California Office of Environmental Health Hazard Assessment, which aims to identify and analyze chemicals released from crumb rubber and artificial grass blades on fields in

Research has looked into how crumb rubber could affect the body when it is ingested or when it comes in contact with skin, or whether it releases harmful chemicals into the air.

California, then learn if exposures pose possible health risks. The study also will sample the air above fields, evaluate how exposure could affect children differently than adults, and study the possible exposure to chemicals by swallowing the rubber or having skin contact with the material,

OEHHA says. CalRecycle, which regulates recycled tires in California, commissioned the study and expects results in June 2018.

Al Garver, president of the Synthetic Turf Council (Atlanta), says STC supports the calls for more scientific studies and tests. The council worked with researchers from OEHHA's study to help identify locations of several hundred fields throughout California. "The more it's studied, the more it will validate the fact that the rubber is inert," he says.

CRUMBS OF CONCERN

Despite the scientific evidence to date saying crumb rubber does not pose health or environmental concerns, some communities have opted to ban or avoid crumb rubber infill for turf fields out of caution, saying future studies still could uncover dangerous effects.

Public concern has increased in the last year after several news stories investigated the potential risk for athletes who are exposed to crumb

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rubber. One such story was an NBC interview with Amy Griffin, associate head coach for the University of Washington's women's soccer team, who says she keeps a list of young athletes who played on synthetic turf who have gotten cancer. In an NBC News investigation in 2014, Griffin says her list is not a scientific study, but it makes her wonder if there is a strong link between exposure to crumb rubber and cancer. Some critics of crumb rubber who echo Griffin's concerns have said none of the tests have examined the effect of prolonged exposure to turf, especially in children, or that previous studies have used sample sizes too small to yield conclusive results. Others say more data are needed about specific people who have possibly developed health problems from crumb rubber: How long and how often did they spend time on the fields? And do other factors—such as a person's age, the methods used to construct the field, or even the weather—play a role? The concern has spread to places like Edmonds, Wash., which voted in December to

put an 18-month moratorium on installing any new synthetic turf fields made with crumb rubber infill from recycled tires. The city council enacted the moratorium after residents protested the local school district's plans to take out the aging grass field at a school campus and replace it with synthetic turf. Patrick Doherty, the city's economic development and community services director, says field construction was already underway when residents learned the new field would have crumb rubber infill, so workers completed the project before protests could halt construction. Because of the community outcry, he says, other fields that were scheduled to get similar upgrades won't see that happen, at least during the 18-month moratorium.

Residents were very clear about their worries, Doherty says. Some showed up at city council meetings with vials of crumb rubber they had collected from the new field. "They were upset. They were saying, 'Do you really want your children playing on this?'" Some say previous studies,

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though numerous, have not gone deep enough. If crumb rubber might cause cancer, he says, “a big question [residents ask] is, how much do you have to be exposed to, and in what ways, for that potential cancer to be caused?” Edmonds is awaiting the results of the new California crumb rubber study, which could help the city decide its next move when the moratorium winds down. “A lot of people want more information,” he says.

Those who oppose crumb rubber and those who defend it both look forward to results of upcoming studies that aim to fill gaps in the knowledge about crumb rubber’s properties.

Edmonds isn’t the only community avoiding crumb rubber. On the other side of the country, Montgomery County, Md., says it will not provide public funding for crumb rubber infill when building new synthetic turf fields at schools and public parks. In Montgomery County, the city of

Gaithersburg’s first outdoor synthetic turf field, built in September 2014, was built with organic infill made of materials such as cork, rice husks, sand, and coconut fibers. Officials chose the organic material because community members voiced concerns about crumb rubber’s possible environmental and health impacts, says Michele Potter, director of parks, recreation, and culture for Gaithersburg.

Potter says the city had long wanted to revamp a large grass sports field that was suffering from heavy wear and tear. Synthetic turf was the obvious choice, she says, because it lasts longer and stands up to soggy weather better. The decision to use the organic infill was out of an abundance of caution, she says, adding that the discussions about crumb rubber versus alternative infill had more to do with possible environmental concerns than health concerns. “My concern was for the environment. ... What if in several years, the EPA says [we] have to remove all these fields?” None of the city’s future fields will use crumb rubber



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infill, especially when there's even a small chance that crumb rubber might cause health or environmental problems, she says. "There are other options out there that can be environmental and health-conscious."

THE CASE FOR CRUMB RUBBER

Positions such as those Edmonds and Montgomery County have taken frustrate recyclers and rubber manufacturers, who feel science is on their side and the crumb rubber fears are unfounded. More than 70 independent, peer-reviewed studies done over the past 22 years have offered enough evidence to clear crumb rubber's name, says ISRI President Robin Wiener. "These studies have pointed to the conclusion there is no indication of negative health effects tied to crumb rubber's use in artificial turf" based on the current information, she wrote in an Oct. 27, 2015, letter to EPA Administrator Gina McCarthy. The letter asked the EPA to respond to the public's concerns by highlighting the research, including the EPA's own studies.

Some states and communities have reached the same conclusion about crumb rubber's safety, and they say natural grass turf can have its own problems. In fact, crumb rubber supporters say research should compare artificial turf to natural turf as a baseline because some natural grass fields are maintained with fertilizers that might have toxic chemicals. Fairfax County Public Schools in Virginia has 48 synthetic turf fields with crumb rubber, and it stands by its decision to keep the fields, saying scientific research has not shown any concerns. The Virginia General Assembly in February tabled a bill that would have imposed a three-year ban on installing crumb rubber synthetic turf fields at any public or private school or in public parks near schools.

Several other communities are planning to upgrade sports fields with crumb rubber turf infill. The Jackson County, N.C., school district recently received a grant from the National Football League to help install a turf field. In an interview with *The Smoky Mountain News*, Superintendent

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Mike Murray said, "I personally think when you look at the research [crumb rubber] does not signify a significant risk for our students."

Garver with the Synthetic Turf Council agrees that crumb rubber is not putting anyone in danger. The council closely follows crumb rubber research, he says, and it has compiled an online database of more than 60 studies and research papers on the subject. The council also created environmental guidelines for synthetic turf infill that ask manufacturers to follow the European toy safety standard known as EN 71-3, "the highest standards, meaning the lowest allowable levels, relating to carcinogenic heavy metals," he says. Crumb rubber producers, sports field builders, and others can get the infill tested to make sure it is within the guidelines. Current crumb rubber suppliers that are members of STC already meet the specifications, he adds.

Mark Rannie, vice president of Emanuel Tire (Baltimore), also believes the concerns come more from fear than facts. As chair of ISRI's Tire and Rubber Division, he has followed the issue closely. Though he says communities and organizations have a right to decide whether to use crumb rubber or an alternative on their fields, he wishes people would read the studies to help them make the decision instead of discounting crumb rubber because other communities have concerns. "We just want the truth out there ... crumb rubber is not problematic, according to the studies," he says. "If a state agency or government agencies decide to declare a moratorium based on [fear], they are basing it on a political cause, not a scientific one."

Rannie doesn't expect future studies to indicate health risks, but he says the tire recycling sector welcomes the research. More information and research can help inform the public and show that there's nothing to fear, he says. And, in the unlikely event of a problem, he says, tire recyclers have

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to step up and be part of the solution. "You have to put health over business," he says.

IMPACT ON THE INDUSTRY

Tire recyclers wonder how these crumb rubber concerns will affect their business. Crumb rubber is a significant market for recyclers, according to the Rubber Manufacturers Association. An estimated 3.7 million tons of tires were recycled into new products in the United States in 2013, and about 24 percent, or 975,000 tons, became "ground rubber," as RMA classifies it. The association does not keep separate statistics on how much of that ground rubber material goes into turf fields alone, but about 17 percent of it went into all types of sports surfacing, such as turf fields and rubberized running tracks, says spokesman Dan Zielinski.

Though synthetic turf fields can use several different types of infill, the vast majority—about 98 percent—use crumb rubber. The STC says the use of crumb rubber for sports fields and landscaping has kept more than 105 million used tires out of landfills. A single professional-sized field could use about 25,000 tires for infill, according to FieldTurf (Montreal), which has built artificial turf fields for both municipalities and professional sports teams.

Emanuel Tire processes about 17 million tires a year. Of that, about 15 to 20 percent becomes crumb rubber. Business is still going well, but Rannie says he is starting to get phone calls from customers who all have the same question: "Is it safe?"

STC's Garver says alternative infill is becoming more common as communities investigate ways to install turf fields while avoiding the controversy of crumb rubber. That's disappointing for people like Rannie, who feels trapped by the bad PR.

A public relations adviser to ISRI recommends that recyclers use a fact-based approach when dealing with detractors and opposing viewpoints.

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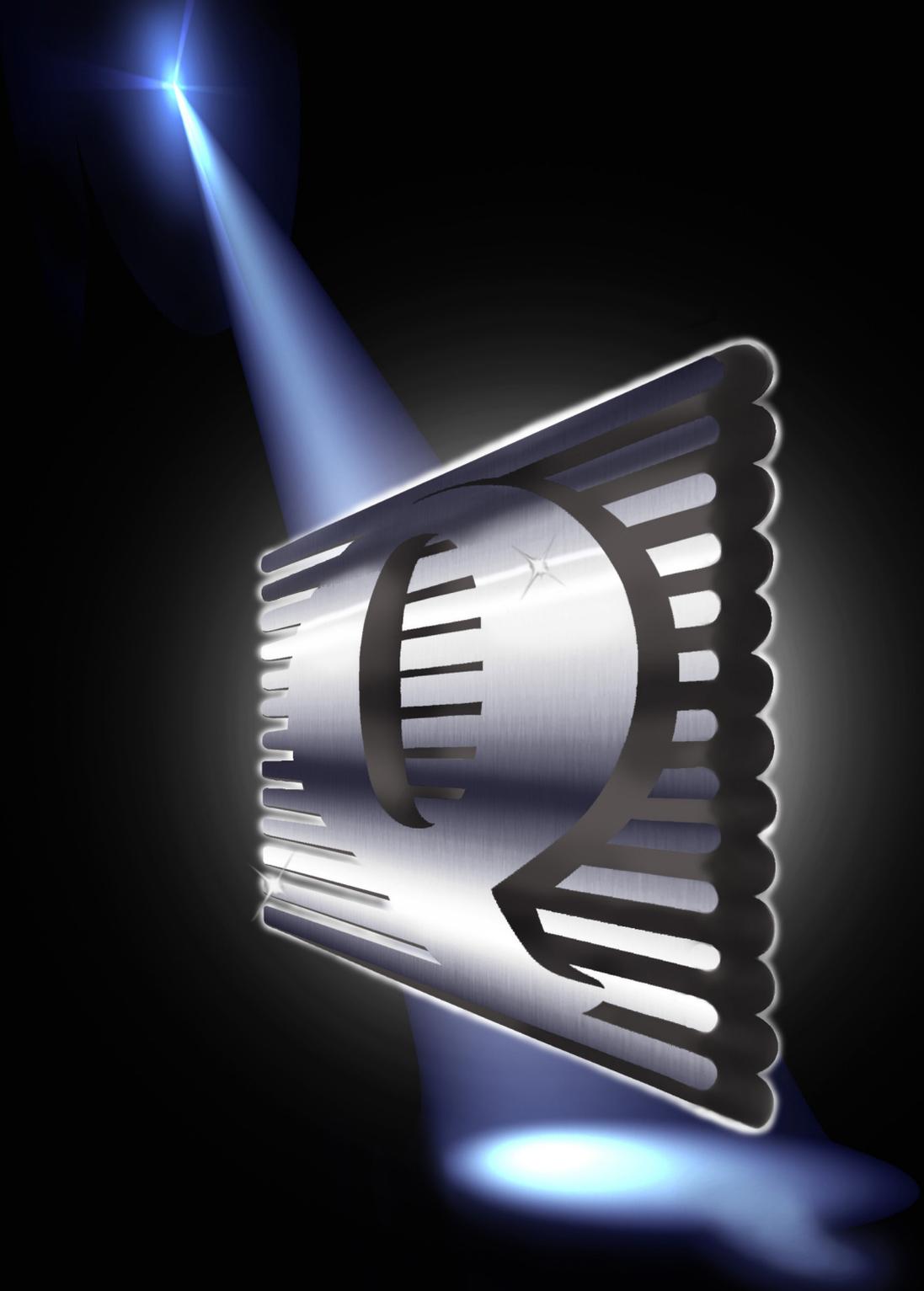
The same holds true when informing your customers: Help them understand the issue by pointing to the scientific evidence while striking a reasonable tone, sticking to the facts, and not letting emotions come into play, the adviser says.

Though synthetic turf fields can use different types of infill, such as rice husks or sand, about 98 percent use crumb rubber, the Synthetic Turf Council says.

Rannie has copies of several crumb rubber studies on hand, and he's willing to print copies for anyone who wants one. It's a way to calm fears by offering clear proof, he says. "Parents see the news reports and call to ask, 'Are my kids going to get cancer?' We show them the studies so they can see for themselves" that the research to date has concluded the material is safe, he says.

Those following the crumb rubber debate know it is far from over. Back in Edmonds, Doherty says officials are monitoring any new and ongoing research on crumb rubber so they can be fully informed during the 18-month moratorium. Results from the California study may help Edmonds decide how to move forward with new field construction, but it may not be enough to sway worried residents, he says. And in Baltimore, Rannie acknowledges that it may take much more time—and many more conversations with worried customers—before the matter of synthetic turf is settled. Between now and then, many more soccer, baseball, and lacrosse games will go on, but "the best outcome is having the truth, having the evidence, and having those facts listened to," he says. **LS**

Megan Quinn is reporter/writer for Scrap.



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