Take Advantage of New Athletic Turf Technology
By George Cowan

In the past few years, there has been a veritable avalanche of articles and studies extolling the dangers inherent in artificial turf. These reports have focused on five areas of concern:

* Carcinogenic and toxic exposure to humans from components of the rubber and/or sand of the infill material
* Carcinogenic or toxic exposure from heavy metals and other chemicals in the synthetic turf yarn polymer and/or pigment systems
* Exposure to bacteria, fungi, or mold, which has propagated in the infill matrix
* Environmental contamination, especially of the aquifer, from run-off through the infill and turf backing
* Excessive synthetic surface temperatures during high ambient temperature and severe solar energy exposure

Each of these areas of risk is coming under greater study, but no definitive conclusions can presently be drawn. Yet, many public officials and self-described "experts" are calling for moratoriums on the installation of synthetic turf. Unless these officials and experts have unstated agendas, such an approach indicates acute unfamiliarity with advanced replicated grass technology, which can virtually eliminate the enumerated risks and concerns. No need to throw away the artificial turf baby—just keep it out of the eco-toxic bathwater.

Let's examine how much current technology cleans up that dirty bathwater and virtually eliminates all risks.

Problem #1
Recycled-tire rubber contains carcinogenic and toxic chemicals and "documented chemical exposures to a variety of volatile organic compounds, semi-volatile hydrocarbons, and other contaminants exist."

It is clear from studies that rubber and sand (silica) contain hazardous chemicals and that humans are exposed to these chemicals through contact, through out-gassing above a threshold temperature, through run-off into the aquifer, and through ingestion. What remains to be determined is whether these exposures have the potential to exceed safe levels. Such determination will take some time.

Solution #1
Eliminate the recycled-tire rubber and silica sand hazards as a risk factor. There are eco-safe alternative infills that do not contain any of the potentially harmful chemicals of ground tire crumb rubber or the respiratory irritants of silica sand. There are no harmful chemicals to be inhaled, ingested, out-gassed, or leached into run-off.

Problem #2
Most synthetic grass filaments or their pigment recipes contain trace amounts of heavy metals. The source of these chemicals is more the pigments used rather than the filament polymer, especially if

the base polymer is a polyethylene. As with toys, the country of origin can affect the heavy metal content. Also, some colors, such as canary yellow, tend to contain more heavy metals than other colors. The question is whether the synthetic turf exposes users to harmful levels of such chemicals through contact, inhalation, or run-off.

Solution #2
Eliminate the possibility of any type of harmful exposure by choosing a filament yarn and color with extremely low trace amounts of heavy metals. This requires a certification or "heavy metal statement" from the yarn manufacturer (not the turf purveyor) pertaining to the specific lots of yarn used on a site. A certification or statement is necessary for each color and lot of the filament polymer delivered to the job site and must be provided by the original manufacturer.

Problem #3
The infill matrix (1.75" for most standard turf designs) can be a Petri dish for the propagation of bacteria, fungi, and mold. This growth is more likely to occur in the lower depth of the infill, where temperatures are moderated by the insulative effect of the upper level rubber and where moisture collects on the backing and in lower level infill. Increasing the density of the turf and thus allowing a reduction in the depth of the infill matrix goes a long way to eliminating this Petri dish issue, but is still not a panacea. In sand/rubber filled systems, where the higher specific gravity of the sand causes it to stratify at the bottom, the moisture and nutrients held by the sand tend to promote mold growth at the backing.

Solution #3
Anti-microbial treated infills virtually eliminate the growth of bacteria, fungi, and mold in the infill depth. With these products, every granule is factory-coated to provide full, durable, anti-microbial protection throughout the full depth of the infill matrix.

Problem #4
Infill rubber contains lead, arsenic, benzene, toluene, cadmium, copper, oil, and carbon, as well as zinc and aromatic hydrocarbons. The extent to which water can leach these chemicals from the infill and contaminate soils and the aquifer is unknown, but anecdotal tests suggest harmful effects on aquatic communities from rubber infill. Significant controlled study, under actual use conditions, is needed to establish a valid level of risk.

In addition, most artificial turf is coated with polyurethane, which can leave significant quantities of free un-polymerized urethane in the coating depending on the mixing, application, and cure process. Urethane is known to cause reproductive toxicity and is listed on the State of CA Prop 65 list of harmful chemicals. Study is also necessary to determine if urethane leaches from these coatings and polyurethane backings need to be tested for free urethane after each production run.

Solution #4
Use an anti-microbial treated product that does not contain any harmful chemicals, which can contaminate aquifers or soils, so no harmful run-off is possible. And, use a turf product that (as a replicated grass) incorporates an eco-friendly polyolefin coating containing no urethane or other harmful chemicals to eliminate concerns of urethane leaching.

Problem #5
Artificial turf produces a higher ambient temperature above the playing surface due to absorption of solar energy (electromagnetic radiation). The reflectivity or albedo of an artificial turf system, including the infill, is generally lower than natural grass (darker colors absorb more electromagnetic radiation) due to the exposure of dark infill. Also, artificial turf and rubber infill do not naturally contain and hold moisture, to provide evaporative cooling, as natural grass and soils do.

Given a specific material (in this case, PE fiber or recycled tire rubber), the darker the color of the material, the more electromagnetic radiation will be absorbed and subsequently re-radiated to the ambient above the playing surface. Obviously, the darker the area of the playing surface, the more elevated the temperatures to which the athletes are exposed during play.

Also, because artificial turfs tend to "lay-over" and expose more surface area directly to the sun's radiation, insolation (solar radiation energy received) can increase dramatically. In hot, dry (less clouds/low humidity) climates, the preponderance of exposed black (rubber) material is likely to create an unhealthy, excessively hot playing condition. Not only is the air temperature above the surface excessive, but the surface temperature of the black rubber is actually dangerous to touch. In addition, surface temperatures exceeding 140F facilitate the out-gassing of toxic chemicals in recycled-tire rubber.

Solution #5
There are eco-safe infill alternative products that reduce artificial turf heat because they have a low albedo due to a light brown color and because they naturally contain and retain moisture. In fact, the natural inorganic component (which can be increased in high-heat climates) is capable of holding more than double its weight in moisture. This renders the infill unusually effective in providing and extending evaporative cooling, when water is introduced for the purpose of cooling the surface. Additional heat reduction can be realized by the use of replicated grass surfaces, which boast a high micron monofilament grass blade that resists "lay-over." This keeps the angle of the filaments with the sun much more acute, which greatly reduces insolation.

So, there it is. Simply by taking advantage of currently available advanced synthetic turf technology, all of the potential risks can be addressed and eliminated. No need to delay your artificial turf installation waiting for the results of studies, which ignore current technology. No need to wait for studies that only address obsolescence. This technology takes you back to the future!

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