SAFETY BY DESIGN

Sprinturf outlines the benefits, in their view, of choosing an all-rubber infill system, as opposed to a sand-only or sand/rubber infill.

In the 1970s, the first sand infill turf systems began replacing the old-style, carpet-like Astroturf, which had been introduced to the world back in 1966. Initially seen as an improvement to the cement-like hardness of an Astroturf surface, sand-infill systems were installed throughout the world. However, subsequent research seemed to suggest that sand too posed a potential problem: this being that due to its porous qualities, the sand, and duly the field, could become contaminated, potentially infecting those who played on it.

By the 1980s, Sprinturf had helped to pioneer a revolutionary new type of infill. The Company began mixing granulated rubber with sand, which provided a safer, softer, less abrasive surface. While this was a vast improvement on the sand-only infill, Sprinturf's objective became to eliminate the use of sand altogether, due to the potential safety and contamination issues. Following significant research during the 1990s, Sprinturf engineers introduced the first all-rubber infill system, catapulting the industry into the fourth generation of synthetic turf systems.

Sprinturf's innovative products have consequently included an assortment of coloured rubber-infill, which also helps control the surface temperature of an athletic pitch. According to Bruce Cheskin, Executive Vice President of Construction at Sprinturf, this would seem to beg the question as to why other turf companies choose not to protect their customers' and athletes' safety by recommending all-rubber infill systems. (Something these companies may wish to challenge and discuss.)

Sand — It's no Day at the Beach!

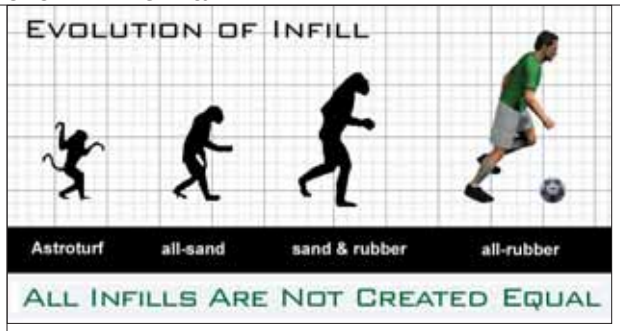
Research would seem to point to the fact that sand produces a hard, abrasive playing surface, and potentially poses serious hygiene problems for athletes due to the fact it absorbs the players' blood, vomit and sweat, as well as urine, odours, fungus and algae. In addition to this, it can get into the players' eyes, irritate their skin, and possibly lead to serious 'staph' infections.

Studies from the Center for Disease Control have concluded that a strain of staph known as Methicillin-Resistant Staphylococcus Aureus (MRSA) is particularly resistant to many common antibiotics, making it extremely difficult to treat. If MRSA gets into the bloodstream, it can damage organs and bones, and in rare cases it can be fatal. Until recently, MRSA was only seen in hospitals and health care centres, but it would appear that, as of late, cases have been confirmed in athletes.

According to the article "Pro Football Players Pass Staph Infections" by Dr Jennifer Warner, American football players are experiencing an increased risk of staph infections due to 'turf burns' [these are areas of skin rendered raw by a sliding tackle, or the like, on an abrasive artificial turf] as both the source and means for spreading the bacteria, which invades the body via cuts in the skin. Dr Warner advised that turf burns were being reported on a regular basis, with around two to three serious incidents per week, among players during practices and games. Warner believes that these abrasions, if left uncovered, and combined with frequent skin-to-skin contact during a season, could potentially lead to members of a team becoming infected with MRSA.

Dr Warner also pointed to the fact that in certain cases, high school athletes who had played on sand infilled synthetic turf surfaces had had to be hospitalised in order to receive antibiotics to cleanse their body of this infection. Others had

Left: Home field advantage — Utah State University's Romney Stadium with a Sprinturf all-rubber infill surface.



Right: Sprinturf's interpretation of the evolution of infill.

Compare the Infills

	Rubber	Sand
Texture	Soft and non-abrasive - Easy on skin and fibers.	Coarse and abrasive to skin, eyes and fibers.
Porosity	Non porous - Can't absorb moisture, impurities or odors.	Porous- Absorbs and holds moisture, contaminates and odors.
Weight	Non-Applicable in a 100% rubber infill system. Can't over compact in a 100% rubber infill	Up to (5) times heavier than rubber- stratifies and compacts, clogging drainage and making system hard.
Hardness	Firm but cushioned.	Rock hard
Size	10-20 Mesh- Larger granules than much smaller sand particles. Won't compact or get	Very small abrasive particles like in sandpaper. Compacts and gets into players' eyes.
Heat	Cooler, does not absorb as much heat	Absorbs 30% more heat than rubber.

Above: A comparison chart of sand versus rubber as an infill material.

SPRINTURF

had to endure numerous doctors' visits in order to drain the painful puss and mucous that collects under the skin. Dr Warner felt that this could also pose a problem to other athletes coming into contact with the infected sand infill.

Not all Fun and Games

According to Walter McLeod, President of the North American Clean Beaches Council, due to its porosity, sand has levels of bacteria five to ten times higher than water. Research conducted at the Lake Michigan Ecological Research Station of the U.S. Geological Survey suggested that bacteria in water can die, disperse, and dilute, but E. coli found in bird droppings (some geese produce up to three and a half pounds of excrement per day) and human waste, can attach and flourish in sand for weeks, and even months.

In 2003, studies conducted of a freshwater beach in Chicago found bacteria levels in the sand averaged up to ten times that of the swimming water. The City replaced the contaminated sand but within just two weeks the bacteria levels had returned to similar levels as prior to the sand being changed.

It could therefore be concluded that the breeding ground for bacteria in sand infill turf is considerably worse than that of sand at the beach, where UV rays are in direct contact with sand at the shore, which helps kill some of the harmful bacteria. However, in an artificial turf setting, because sand is heavier than rubber (especially when wet), it has a tendency to shift towards the bottom of the turf. It would be particularly hard for UV rays to penetrate through the turf fibres and rubber to get to the contaminated sand and kill the bacteria. Therefore, one could deduce that the sand infill is an able breeding ground for disease.

Water also has no effect on the sand because it will simply absorb the water instead of flushing out the bacteria. While most turf systems have double textile and coated backings in common, some have a mesh drainage system instead of drainage holes punched in their backing, which could severely limit its drainage capability. Because of this, it would seem that the sand could potentially be infested with harmful bacteria indefinitely, making it even worse than the bacteria levels found at the beach!

Solution Found

A bird's eye view of the Sprinturf field at St. John's University Clemens Stadium in Collegeville, Minnesota.

Sand has been in use for infill systems for over thirty years, but with the possible problems associated with it, one must wonder why anyone would consider, let alone install, such a surface. The simple answer is 'ballast'. Many of these systems use a mixture of up to 80 percent sand by weight to help hold down the turf. All systems on the market use sand specifically for this purpose. If not, the turf will expand and contract, losing the proper footing characteristics an athletic field needs. One would also see over time, the misalignment of field markings due to the shifting panels of turf. For decades, no one came up with another system to help solve this problem, until Sprinturf introduced its triple-layered, woven/non-woven backing system called 'Stabilon™'. For the first time, this innovation allowed 100%, all-rubber fields to be installed, achieving both dimensional stability and safety.

Sand compacts over time, leading to a harder surface, and also compromises the footing and playing characteristics of the field. Remember, sand is far more abrasive, and will also break down the fibres of the turf — thus ruining a venues investment — it is, after all, the main ingredient in sandpaper. A hard surface tends to lead to an increase in injuries and less time on the field for players. It is bad enough for expensive, high profile athletes to get hurt and develop staph infections, causing them to lose playing time on the field; however these players make up only a small part of the population, and some would argue are compensated handsomely. Ninety-nine percent of the people using these fields are boys and girls, along with weekend warriors who face the same dangers.

The Alternative: Rubber Infill

Sprinturf was the first to introduce an all-rubber infill system, which was aimed at decreasing the numerous problems associated with a sand synthetic turf infill system. When the Company was awarded a United States patent for its revolutionary system, a new standard was set — many companies now also offer an all-rubber solution. However, some resolutely stand by their sand and rubber infill systems.

Sprinturf believes in providing the very best investment for its field owners and playing conditions for athletes. So, some three years ago, they partnered with NovaCare, a nationally recognised rehabilitation centre with over 500 locations across North America, to proactively test and develop ways to help reduce and prevent athletic injuries. Through its Athletic Training Services Program, NovaCare serves as the official rehabilitation provider for most of the high school, college and

SAFETY BY DESIGN

professional sports teams, providing injury prevention, management and treatment throughout the United States.

"As athletic trainers, our number one priority is to prevent injuries from occurring. Sprinturf's product is the best and most natural product we've ever seen, and dramatically reduces turf-related injuries, which in turn decreases the amount of on-field injuries. In fact, our research shows Sprinturf is safer than natural turf because of the lack of changing characteristics in the field-like mud and divots," stated Kelly Why, Director of Athletic Training Services for NovaCare Rehabilitation.

Environmentally-friendly

Sprinturf fields are also extremely friendly to the environment. Tyres that would normally be exported to toxic waste dumps or thrown along the roadside to become mosquito breeding grounds, are now being turned into athletic fields through a vigorous collection, recycling, cleaning and colouring process. Up to 30,000 tyres are used for each athletic pitch!

Granulated rubber is non-porous, non-abrasive, and won't absorb contaminates, which will simply pass right through the system, the base, and out of the thousands of drainage holes. Rubber also drains faster than sand, so it won't compact or change composition, and is totally non-toxic. That means if it is ingested, it will simply pass harmlessly through the human system.

Rubber adds another advantage: safety. G-max levels are one of the most important standards to determine safety for the synthetic turf industry. Soccer, American football, baseball, lacrosse, and many other sports played worldwide, have all adopted the G-max rating as a way to determine the safety of athletic pitches. It is used to measure the shock attenuation of a field, with different readings determining the "hardness" of a field. A G-max rating of 60-90 denotes a very soft field, which could indicate a spongy or muddy playing surface that could cause muscle fatigue. This rating is not good for most sports, but is considered a perfect condition for playgrounds. However, a range between 100 and 135 would denote a natural grass playing surface in pristine condition for almost every sport. The objective for an artificial turf system is to therefore provide a playing environment closest to natural grass — the use of an all-rubber infill system duly helps improve the G-max rating of a surface and increases its safety.

Sprinturf prides itself in obtaining a G-max level within the natural grass range, and guarantees it for a period of eight years through an insured warranty programme. Finally, when most athletes play on an all-rubber infill field, research suggests that they prefer it to when playing on a sand and rubber infill surface, as it would seem to 'play' more like a natural field in pristine condition.

Sand/Rubber Heat Index Comparisons

Sample ID	Max Temp Heat, °F
Temp. Inside Test Chamber	158.58°F
80% Sand 20% Rubber 14-30 Cryogenic Rubber	188.25°F
10-14 Mesh Crumb Rubber - Black	136.59°F
10-14 Mesh Crumb Rubber - Green	128.05°F
10-14 Mesh Crumb Rubber - Lt. Brown	117.79°F

Left: This graph shows how sand heats up faster and hotter than its surrounding environment. Note that none of the all-rubber infills reach the inside test chamber temperature.

Below: CoolFill™ system using CoolSpray™ reduces the surface temperature by up to 30% in 15 minutes. Both tests were done by independent test lab, Testing Services, Inc.

CoolFill™ Heat Index

Sample ID	Initial Surface Reading	Reading after 15 Minutes
Cool Fill/Light Brown	104.34°F	74.31°F
Cool Fill/Green	100.25°F	70.91°F
Cool Fill/Black	103.28°F	75.37°F

Exclusive Systems from Top to Bottom

Sprinturf holds patents, trademarks, and exclusive distribution rights for its non-stone base systems, fibres, backings and complete infill packages from top to bottom. Their 'Ultrablade™' is a revolutionary fibre that uses a hybrid polymer technology, which reputedly feels softer and is more durable than the leading competitors. Sprinturf also advised that Ultrablade™ displays three times the strength of other fibres, providing owners with a field that will last far beyond that of its competitors. Visit: www.ultrabladedrilltest.com and see how Ultrablade™ compares to other popular fibres in the "seeing is believing" test.

Sprinturf's Stabilon™ triple backing system provides superior dimensional stability to help control ball movement.

Sprinturf's patented products use the newest technology to provide superior strength in every stitch of the fibre to ensure dimensional stability. Stabilon™, a triple layered backing material consisting of woven and non-woven fabrics, is heat and UV resistant, provides dimensional stability in all directions, and prevents stretching, shrinking, creeping and line distortion.

Each one of these components defines the patented Sprinturf system. The Company even installs its own fields, using its own employees, in order to monitor quality control and maintain the highest installation standards possible, as well as offering warranty, and services all of its fields in-house. Being vertically integrated means Sprinturf knows the quality of the installation is the same no matter what part of the world it's done. Relying on distributors and third party installers can, for obvious reasons, be very risky when it comes to completing necessary repair work.

Green with Envy

Sprinturf has developed various differently coloured infill systems to help alleviate the problem of the surface getting too warm in hot climates. CoolFill™ technology uses green or tan rubber granules to reflect the heat normally absorbed through the surface. This reduces the temperature of playing surfaces by up to 30% due to the use of these light coloured granulated rubber infill instead of the traditional black material.

In desert areas where fields get very hot, CoolSpray™ by Sprinturf can offer additional relief for practices and games. The system entails a specially designed series of water cannons installed along the field's perimeter, and when coupled with CoolFill™, will dramatically cool a soccer pitch or football field in just ten minutes, without compromising footing. Sprinturf also has a water capture and detention system available so much of the same water used to cool the field can be recycled over and over again.

On many occasions practices or games have to be cancelled due to heavy rainfall causing a muddy and unsafe playing surface. HydroCore™ offers an alternative to a stone-base synthetic turf system, which drains up to ten times faster, cuts installation time in half, never puddles, maintains a level playing

Yes, it's synthetic turf — Smith Wills Stadium in Jackson, Mississippi, enjoys a full game of baseball on Sprinturf's all-rubber synthetic turf.

The Valdosta Wildcats in Valdosta, Georgia, have the most wins ever, with some 821 all-time wins to their name — a National High School Federation record! Here is a look at their Sprinturf system in Cleveland Field at Bazemore-Hyder Stadium.

field, provides uniform drainage under every inch of the playing surface, lowers maintenance costs, and allows superior flushing and sanitising of the field. HydroCore™ is also lighter than stone base systems (a full-sized field can be delivered in one tractor trailer), making all applications for athletic fields and playgrounds a practical option.

No stopping at the Goalposts

Sprinturf began receiving requests from 'fans in the stands' to see how their systems and technology could be used for home applications and playgrounds. This led to the beginning of an entirely new line of products used outside of the stadium, and Sprinturf's Specialty Products division was born.

LawnScape™ is being widely used for the homeowner and developer to reduce the time and money spent on mowing, weeding, feeding and seeding, as well as on excessive watering and high maintenance bills. LawnScape™ also eliminates the need for chemical fertilizers and harmful pesticides. The system is totally non-toxic and recyclable, drains rapidly just like the athletic fields, and is pet friendly.

Turf can be applied to playground surfaces as well, to reduce the amount of injuries and problems associated with woodchips, sand, or urethane surfaces. SafTurf™ is safer than sod, sand or woodchips, softer and less expensive than urethane, and protects children from impact injuries through its ADA compliance and by meeting all ASTM F1292 criteria (including HIC rating) for up to 10' fall heights. It can be played on immediately after heavy rainfall without the risk of mud and grass stains. Customers include daycare facilities, homeowners, school districts, restaurants, cities and municipalities, private and public venues, resorts and clubs.

RubbaMulch™ and Pour & Play™ are products to benefit the homeowner, developer, cities, and the environment. Shredded tyres are cleansed and coloured to meet specific landscaping purposes. RubbaMulch™ is used to replace woodchips for home and commercial lawn care needs. One application of RubbaMulch™ is guaranteed for five years, holds moisture, does not promote fungus and algae, and is not a breeding environment for insects. Pour & Play™ is used primarily as a cost effective alternative to SafTurf™ and also is ADA, HIC, and ASTM compliant. It is a colourful option to wood and sand, which also protects children from bumps and bruises as it cushions their falls.

GolfGrass™ encompasses a blend of components designed to simulate the playing characteristics of well-maintained natural turf for golf courses. Shade, water, nutrients, pesticides, and environmentally sensitive areas are no longer maintenance issues, and it also eliminates wear and tear from high traffic areas. GolfGrass™ is made in several different versions for putting greens, tee lines, hazards, fairways and target greens.

Synthetic turf can go anywhere, with applications including athletic training areas, rooftops and terraces, office buildings, condominiums, shopping centres, homes, median strips, cemeteries, playgrounds, dog parks, and all areas of golf courses. To learn more about these products, visit: www.sprinturfsp.com.

Round Up

In conclusion, President of Sprinturf Mr Elliot Levine, commented: "The synthetic turf industry in general has continued to improve its technology over time by introducing new fibres, backings and infill systems. Sand as an infill was first introduced as a method to provide players with an athletic edge, but in reality only led to long-term problems. As with most new technologies, even when the introduction of a mixture between rubber and sand first came about, the tendency to lean toward sand still remained. However, now the all-rubber infill system is standard, installing a system with sand is no longer a risk field owners need to take.

"Though no one can tell for certain where or when the next breakthrough in artificial turf will occur, you can be sure that Sprinturf will be at the cutting edge of innovation, constantly working on new technology to improve its products even further."

For further information visit: www.sprinturf.com

Please note: This article represents the views and findings of Sprinturf.

Below: The St. John's Johnnies score on their Sprinturf field without the worries of impact injuries.