Infill plays critical role in success of synthetic installations

Editor's note: *Randy Happel of Two Rivers Marketing in Des Moines wrote this article on behalf of CushionFall Sport, Ames, IA. We believe it contains good information on synthetic infill products and installation.*

WE'VE COME A LONG WAY since the early 1960s when the first artificial turf was installed; a surface that was essentially a crowned nylon carpet with accompanying pad that was likely installed on a concrete foundation. Now in their third generation, today's synthetic turf systems are highly sophisticated engineering and design accomplishments constructed of soft, natural-looking fibers that are lushly tufted and supported by a granular infill material, most often made from recycled rubber tires.

The complex designs of current synthetic turf systems can make planning a new installation somewhat of a laborious task. After all the feasibility studies, securing funding, site surveys, etc. those entrusted with deciding on all the specifics will soon discover there are a myriad of options available, and a saturated market of system builders and material suppliers eager to convince you that their offerings are better.

Beyond the obvious—choosing an architect, turf supplier and reputable installer—next come the specifics, paring down and finalizing the final details and specifications of what will become the recipe for the new surface. Do not underestimate the importance of some of the details, including the infill.

TYPES OF INFILL

Infill is a required component of all athletic synthetic turf systems. Some systems require only a single infill while others may specify a combination approach. The menu of infill schemes and options is as complex and diverse a coaching playbook. Add to the equation all of the different ratios of each substance and varying application depths, all designed to create a surface that exhibits a desired property, and it's easy to see why the infill decision can be so confusing, yet is also so critical.

There are essentially four types of infill materials to consider. The majority of synthetic turf systems installed today use styrene-butadiene rubber (SBR) crumb infill, a material that originates from recycled rubber tires ground or smashed into small pellet-like particles. SBR crumb has served as the primary topdressing on synthetic turf surfaces for nearly two decades and remains the infill of choice today primarily because of many attributes including elasticity, resiliency, durability and affordability.

An alternative to crumb rubber, a substance composed of a thermoplastic elastomer in the shape of tiny discs of exact and uniform specification has also emerged. In addition, silica-based granules coated with an acrylic liquid that exhibits some of the properties found in

➔ Infill is a required component of all athletic synthetic turf systems.

Encapsulated infill

Despite the affirmation of safety declared 20 years ago by the EPA and later substantiated by scores of independent research studies, Colorbiotics, a provider of colorants headquartered in Ames, IA challenged their team of research scientists and laboratory technicians to develop an infill alternative to traditional crumb rubber. The result is CushionFall Sport, an encapsulated crumb rubber infill that is among the most environmentally safe, VOC- and heavy metal- reducing crumb rubber infill products available.

The colored encapsulation coating that encompasses the individual crumb rubber particles repels water and moisture more readily than the traditional recycled crumb material. This allows fields to drain more quickly, promoting a drier playing surface. CushionFall Sport allows for 21% more water to pass through the playing surface than that of standard SBR crumb rubber.

When used as an infill component, ambient rubber has the propensity to float and scatter as the air bubbles located within the rubber facilitate simple infill migration. When SBR rubber is coated it fills the voids and makes the particles smooth and more rounded. This facilitates a consistent flow of water through the infill without raising and displacing any rubber.

Independent studies show the encapsulation process of CushionFall Sport reduces VOCs by 71 percent and heavy metal runoff by 80 percent.

Over time, traditional crumb rubber infill loses flexibility and elasticity after continuous exposure to bright sunlight. CushionFall Sport protects the properties of the rubber, extending longevity and durability. The material is also UV-resistant, helping fields retain their shock-absorption properties and reducing static charge often created by the various components common to synthetic turf surfaces.

The bright green encapsulation coating contributes to a more vibrant, realistic-appearing surface and eliminates the 5 o'clock shadow effect common with black crumb rubber.

www.cushionfallsport.com ■

crumb rubber have also entered the scene. Because these materials are produced specifically for synthetic turf applications, project owners should be aware that using either will add roughly 20% to the overall cost of a field compared to crumb rubber.

It's the infill in conjunction with varying fiber specifications that allows architects and system designers create a playing surface that exhibits a desired property with playability characteristics that are conducive to maximizing athletic performance. What you want to accomplish on the turf often dictates what will be specified of the various material components selected to construct the field.

The vast majority of infill materials are installed in combination with silica or natural sand, which serves to stabilize the playing surface. Sand promotes a firm and stable foundation and also helps maintain the integrity of the individual synthetic fibers by keeping them upright, evenly spaced and enhancing their resiliency. The infill is also essential to ensure seam integrity and eliminates the creation of wrinkles on the surfaces.

Typical infill ratios (sand versus crumb material, etc.) can vary from 40 to 80% blade coverage. Generally speaking, the more sand, the firmer and faster the surface. Tufting companies will work with the system's integrator and installer to specify the tufting style (who knew, right?); along with the infill ratio and materials for the field, all dictated by pre-determined formulas that they have established in order to warranty surface performance factors and to pass specific EPA, ASTM and other authorities' standards and testing.

Infill materials will vary in size, color, quality, shape and mass and will differ in their abrasiveness, which, if high, can affect the integrity of the yarn fibers, depending on frequency of use over time. Finer, rounder silica sand has replaced the everyday beach variety and is less abrasive to fibers and less susceptible to compaction.

Infill materials can often vary in quality; project owners should exercise caution to secure materials that meet or exceed the specifications recommended by ASTM standards. To meet warranty specifications, many system integrators will insist that infill materials meet or exceed their surface materials specification or surface warranties will likely be voided.

Infill providers will be able to provide material safety, handling, installation and manufacturing specifications, along with life expectancy. Typically, most infill components installed on synthetic turf systems retain their effective use properties for an average of seven to 10 years and few infill providers will carry any type of warranty on the infill component.

THE ENCAPSULATION EQUATION

Some infill offerings are also available in an encapsulated form, a process involving the application of a coating that encompasses the individual crumb particles. Encapsulation offers several advantages over standard "raw" infill material offerings. Often a colorant is added to the liquid encapsulation coating that can help to reduce the temperature of the playing surface and, as is the case with crumb rubber, disguises the dark black color inherent to the raw material source. This provides for an infill that blends with the hues of the synthetic turf fibers making the surface more realistic-appearing and aesthetically pleasing.

The bright green infill material also helps to eliminate the "five o'clock shadow" effect common with traditional crumb rubber, enhancing broadcasts of sporting events, many of which are transmitted via a high-definition signal. The coating often helps to minimize the electromagnetic properties of rubber, reducing the static cling tendencies resulting from the friction created by the rubber and synthetic materials in contact, and the magnetic attraction of athletic uniforms, the majority of which are composed of polyester or synthetic fibers.

The number of synthetic turf installations has exploded in recent years, but just as the popularity of these systems has grown so too has the scrutiny. Most targeted is the crumb rubber infill, especially since the substance is used in the vast majority of installations and the amount present on each field is substantial. Before the first field was ever installed using recycled rubber tires as an infill, safety has driven the development of synthetic surfaces incorporating recycled crumb rubber as a materials component. To date more than 75 studies have been completed, among the most recent and comprehensive, an in-depth analysis of crumb rubber completed by the Corporation for Manufacturing Excellence (MANEX), San Ramon, CA in conjunction with the Laboratory for Manufacturing and Sustainability (LMAS) at the University of California-Berkeley. The study, as do all those preceding the MANEX / UC-Berkeley testing, concludes that recycled crumb rubber is a safe material for use in synthetic turf applications. ■