Layers of safety

Proper mix of materials for site climate and conditions is critical for a safe racetrack

CONSTRUCTION

by John P. Sparkman

ENSURING the safety of a racetrack begins long before the first horse steps onto a surface that can look as enticing as a secluded South Pacific beach. Track construction is a collaborative process that requires the timely cooperation of engineers who design the track, the construction firm which does the actual building, the consultant advising on soil mixtures, soil material suppliers, the owners of the track supplying the finances, and finally, the weather.

The process starts with the engineer. The principal engineer may design the whole project, or he may be responsible only for the track itself. William S. Foy of L. E. Gregg and Associates of Lexington, Kentucky, has had more than 40 years of experience in constructing and renovating track surfaces all over the country.

"Mr. Gregg and I got into it in the 1950s," Foy recalls. "We were working for the state highway department, and they loaned us out to Keeneland as consultants when they rebuilt their track, and after that we went into business for ourselves. Then when New York rebuilt Aqueduct (1959), they wanted a surface just like Keeneland because they thought it was the best surface in the country."

Gregg and Foy, however, soon found the situation to be somewhat different in New York.

"That was a horrible mess. The construction company for the physical plant had just walked away, and there were posts and wires sticking out of the track area.

"Each track is different, and materials in each area are different, but the concept is still basically the same. It's a matter of trying to adapt local materials to the ideal situation. You have different kinds of problems at every different track. In New York, the problem was finding the right materials. It's an easy thing to design, but not an easy thing to do. Considering variations in materials, it's not easy to come up with the perfect solution the first time. We finally found the right kind of sand up near Albany."

From Belmont to Xalapa

L. E. Gregg and Associates subsequently was involved with the reconstruction of Belmont Park, Saratoga, and other racetracks around the country, and also in the design and construction or resurfacing of numerous training tracks in central Kentucky, including Calumet Farm, Pillar Stud, Whitaker Farm, and Xalapa Farm.

Having supervised the construction of the Pillar Stud (now 505 Farm) training track used for Fasig-Tipton's annual two-year-old sale, the author has some first-hand knowledge of the difficulties sometimes imposed by local conditions, such as the *karst* topography (featuring sinkholes and caves) of Central Kentucky.

Foy agrees, "*Karst* topography presents some problems, but you can design around them. You can run into things like natural underground springs like we did at Pillar, but you just have to work around them. It can cost you money, though. But the actual soils on-site and the natural drainage are more important."

Like roadways, racetracks are constructed in layers. Bill Foy generalizes, "For the base course, you want something that's stable and hard. Around here, you'll mix clay and sand and compact it for stability. The cushion is for the protection of the horse. It's more sand and loam for a softer surface that won't compact."

Drainage is the key

Bart C. Standley, vice president of Edminster, Hinshaw, Russ, and Standley, Inc. of Houston, Texas, served as the chief engineer in designing the new Sam Houston Race Park near Houston that opened successfully on April 29, 1994. Standley's firm had no prior experience in designing racetracks, but was widely experienced in related designs such as roadways and golf courses. He discovered quickly that drainage for the track surface, especially in Houston's humid climate, was of primary importance.

"The key to a track system is the ability to drain quickly, and we had a lot of experience with drainage systems," Standley relates. "The most important factors are 1) knowing the type of soil conditions that you begin with through geotechnical tests; 2) understanding the kind of natural drainage conditions that exist on-site; and 3) understanding the types of soil materials available in the area."

Standley and SHRP tried to utilize ideas from several different racetracks to come up with the best solution for their particular conditions. "We visited several tracks, like Remington, and talked to lots of people," Standley says. "Then we had to take the knowledge of all the consultants and come up with a combination that would function here the way other track surfaces function. The key thing is to find the right materials to go in the sandwich."

Sam Houston sandwich

"Sandwich" is an appropriately descriptive term used to denote the layered nature of the track surface. Standley worked with consultant Dennis Moore of Track Tek, Inc., of Fallbrook, California, to determine the proper ingredients for the Sam Houston sandwich.

As the son of the late Hollywood Park track superintendent Bob Moore, and brother of former Santa Anita superintendent Ron Moore, Dennis Moore brings an impressive racetrack pedigree to back up his reputation as one of the premier track surface consultants in the country. In his 23 years in the business, Moore has been responsible for developing the track cushions at tracks such as Hollywood Park, Remington Park, Woodlands, and Nad al Sheba (for Sheikh Mohammed al-Maktoum in Dubai), in addition to Sam Houston. He is currently assisting with the development at Lone Star Park near Dallas, Texas.

"The number one thing for me has always been the safety of the horses and riders. Fast times just aren't important to me."

—Dennis Moore, Track Tek, Inc.

Moore described the Sam Houston track sandwich from the bottom up:

"At the bottom you have the compacted fill. That's just the existing ground excavated to the proper depth, graded out and compacted. Then you have a course of three-quarter-inch to 1¼-inch rock on the bottom, six inches thick. Next, you have a two-inch layer of pea gravel. On top of the pea gravel, you have six inches of limestone screens (crushed fine limestone screened to three-sixteenths-to-three-eighths inches in size). That's graded and compacted, and you have to grade and compact it to follow the final gradations of the track. Whatever grade you want to have on the turns, or from the inside rail out on the straights you have to follow that in the base.

"The running surface is on top of the limestone screens. We used ten inches of material at Houston, and we used a very fine type of sand there because of the weather conditions. The mixture there is 85% fine sand, and the rest silt and clay. The basic function of the silt and clay is to bind and hold the sand together. We lay down the sand in five-inch lifts, so the bottom five inches gets compacted some by the trucks laying down the top."

As horsemen will be quick to note, tracks with too much fine sand will quickly get cuppy or loose when the weather turns dry. Moore, however, has learned through unhappy experience that too much sand is far better than too little.

"A cuppy track or a loose track you can control, there are things you can do," he notes. "But a track with coarser sand and a lot of loam, if you get a lot of rain it gets sloppy and muddy, and horses start going through to the base, and how do you control that? You do have to have the proper equipment, the will, and the right man in charge to maintain a sandy track. You can have the greatest surface in the world, but if it's not maintained, what good is it?"

Bottom line safety

The bottom line for Moore, however, is always safety. "The number one thing for me has always been the safety of the horses and riders. Fast times just aren't important to me. That ten inches of cushion at Houston is great for safety, because it's a long way down to your really hard base. Some people think it's too much to work with, but if you have two inches of rain in an hour and wash off two inches of a six-inch cushion, you don't have anything left to work with."

Photo by Z

Right recipe

Nelson Barfield of Addicks Services, Inc. in Houston supervised the actual construction of the Sam Houston track surface. Like engineer Standley, Barfield had no prior experience in track construction, but was widely experienced in roadways, golf courses, and private developments, and found many similarities. Barfield, of course, worked closely with both Bart Standley and Dennis Moore.

Barfield compares preparing the cushion for a racetrack to preparing a gourmet meal, "You've got the recipe (from Dennis Moore). Now you've got to find all the right ingredients and improvise for your particular conditions. You have to locate the materials and install them with the highest quality controls.

As is frequently the case, Barfield had to search far and wide to find the proper mix of materials for SHRP. "We had probably a dozen suppliers give me sand samples, and we would mix them and send them to the testing lab in California. They would analyze them and tell us how close we were. We finally had a couple of different samples approved, but the one we thought was most ideal just wasn't available in time, so we went to plan B. We had some problems with that, too, though, so we had plan C tested and that turned out to be better than A or B either one, and the supplier was able to get the sand to us in a very short period of time."

Sand from a supplier on the Brazos River, about 40 miles west of Houston was eventually chosen, and the supplier was fortunately able to work within the severest limit frequently placed on track contractors: time.

Barfield agrees: "It was really tight schedule-wise. Having the right phone call made at the right time of day was sometimes the difference between being able to open on time or not. It could have been a major headache, but we had the owners the decision makers on-site, and that made everything possible."

Sam Houston Race Park was constructed in the nine months from July 1993 to April 29, 1994. The opening date being written in the proverbial stone, contracts with construction suppliers allowed no time extensions, and little room for budget maneuvering.

Just as every climate and soil mixture is different, every construction site for a track has different characteristics that must be taken into account in the design. Pillar Stud's training track was built into a gently sloping hillside, and material from the upslope side was moved to the downslope of the hill to produce a level surface.

Major investment

Joe Mims of Skilton Paving and Construction, Inc. of Lexington, supervised construction of the Pillar track, as well as similar projects at Xalapa and Calumet. Mims notes that, "Finding the right location is the biggest problem. You don't want to hit a lot of rock, so you can keep expenses down. And you can run into some bad soils within a relatively small area, so you have to test the soil beforehand to make sure you have good soils all around your track.

"You've got to have good top soil to mix with your mortar sand for the surface. It's got to be real loamy so that the water will penetrate through it."

Mims observed that a training track is a major investment for any farm. "You're talking about a $500,000 to $750,000 investment for a six-furlong track, just for the track itself, so you'd better get it right the first time."

Pillar's (now 505 Farm) training track has been noted for its safety, and Sam Houston's new surface has elicited positive reviews from all concerned. After hearing complaints from trainers in recent seasons, Keeneland Race Course in Lexington resurfaced its track before the opening of the 1994 spring meet. The change brought markedly slower times, especially early in the meet, and almost universal approval from trainers as a safer, kinder surface for their horses.

Keeneland Association President Bill Greely has been pleased with the results of the renovation. "We sent (track superintendent) Mike Young to some other tracks, particularly Santa Anita and Fair Grounds, to see what they were doing that we weren't. As a result, we purchased two new harrows with a roller in the middle instead of behind. We also added more cushion to the surface. Now we have three inches of harrowed cushion instead of two, and an inch of compacted cushion.

"This track was redone in the '50s and they took out the clay base then. They put in a 12-inch base of compacted sand and soil and a three-inch cushion. We feel like we've made the track safer by adding the extra cushion and improving our maintenance techniques."

With challenges from animal rights advocates screaming over the all-too-rapidly approaching horizon, adding new layers of safety for horse and rider is a timely and humane approach. ⊕

John P. Sparkman is bloodstock/sales editor of Thoroughbred Times.