Playability Versus Liability

Surrounded by attendees of the California Sports Turf Institute at Santa Anita Park, Dr. James Beard explains the effectiveness of Clegg Hammer measurements. Photos courtesy: Stephen Guise.

By Stephen H. Guise

It's third down; the ball is snapped. As the quarterback scrambles, he spots a breakdown in his offensive line. Just as the quarterback releases the ball, a defensive lineman drills him into the turf. His head bounces off the turf like a superball on your driveway. The crowd is hushed as he lies motionless, surrounded by the training staff. The dreaded cart appears. Before the game ends, the local hospital reports that the quarterback "just" suffered a concussion. He'll be back in the game next week.

We saw this too many times this year: from simple abrasions to season-ending injuries; from Jeff George of the Atlanta Falcons to Gil Haskell, assistant coach of the Green Bay Packers, who suffered a fractured skull when two players slammed into him during a playoff game, driving his head into the hard artificial turf.

It's no wonder that organizations such as the NFL Players Association (NFLPA) are taking a stand against field surfaces that they believe are shortening the professional careers of their members.

The NFLPA has launched a crusade to do away with artificial turf in the NFL. Though Troy Squires, vice president of Southwest Recreation Industries, Inc., manufacturer of AstroTurf, was quoted in a recent article as stating that his company was getting a bum rap, many players think otherwise.

When you listen to John Kerr and Clark Gaines of NFLPA, you begin to understand their players' concerns. Darrell Green, a cornerback for the Washington Redskins, had this to say about playing on artificial turf, "The burns literally take your skin off....Half of your arm or the sides of your calves are skinless." The Redskins' Brian Mitchell speaks of the after-effects of playing on artificial turf – the sprained ankles and aching knees and hips. The Bengals' Ki-Jana Carter missed his rookie year after tearing the anterior cruciate ligament in his left knee while playing on an artificial surface.

There is no time in the history of sports that the construction and maintenance of playing surfaces has been so closely scrutinized. Ralph Nader, the consumer advocate, is even involved! Add to this today's extremely active legal system and all the lawsuits flying around. Field playability and the liability factor are linked in a delicate – and costly – balancing act.

Are artificial surfaces the entire reason for increased player injuries at all levels of play?

In all fairness, we must realize that artificial turf is not the whole problem. Poor maintenance and construction of natural turf fields also are to blame. Three NFL teams – the Chicago Bears, New England Patriots, and the Kansas City Chiefs – have pulled their rugs and installed natural turf with their own set of problems.

Gauging Field Playability

The playability of a field is a measure of how safe that field is and at what level of play (field consistency) that field will perform. Terms often associated with field playability are hardness and traction. A field is either too hard or too soft. Traction is either lacking or too great.

The field's hardness has a direct relationship to the speed of an athlete running on its surface. Hardness is also related to the degree of potential injury the athlete will sustain if he or she falls or is delivered to that turf, or if the turf stops a player's forward motion without communicating it first to his or her body.

Strong, fast turf does not necessarily have to be a hard surface. During my tenure at Santa Anita Park in California, thoroughbred horses broke track records on a turf course that was firm, without being hard. There is a difference. Firm turf is a product of sound agronomic

principles, developing deep and dense root systems supporting a thick, natural carpet of turfgrass biomass at the surface.

Soils scientists have faced a dilemma in stabilizing sand fields without creating hard, impermeable rootzones. As various organic or synthetic fiber materials were added to a sand for stability, the valuable pore space necessary for oxygen and water infiltration was filled, resulting in compaction through increased bulk densities. This hard soil supported only limited, shallow-rooted turf, and playability declined. Dr. James Beard and Sam Sifers of Texas A & M University spent numerous years researching this situation and seeking ways to develop naturally tough turf. Their work with a three dimensional system of sand/mesh allowed them to achieve stability and agronomic benefits, with a surface they found could be firm without being hard. (Those interested in further information on the research of Dr. Beard and Sam Sifers, including a copy of "Enhancing Participant Safety in Natural Turfgrass Surfaces Including Use of Interlocking Mesh Element Matrices," presented at the November 1994 American Society of Testing and Materials [ASTM] Symposium on Safety in Football, may contact Stephen Guise.)

Don Waddington of Penn State stands with the Penn Foot for field traction testing.

The Clegg Impact Soil Tester (also called the Clegg Impact Hammer) had been used for years to measure the hardness or compaction of road bases. This instrument is now accepted within the scientific community as a measure of field hardness and is used to relate this field hardness to the safety of the athlete. Hardness standards for both natural and artificial turf fields have been researched by the ASTM, and the Clegg Hammer has been the instrument of choice due to its lightweight structure and measurement accuracy.

How hard is too hard? Many have studied this issue, including not only Dr. Beard and his associates but also the Sports Turf Research Institute (STRI) in Bingley, England. STRI's research focused on soccer fields in Europe while Dr. Beard's findings were based on three years of research at Santa Anita Park. Despite the obvious differences in the "athletes," the hardness criteria are similar in the two sports.

Hardness is only half of the problem associated with poor playability of sports fields; traction is the other half.

Soil scientists have accelerated their studies into the manipulation of sand-particle-size distributions to increase

continued on page 18

Playability

continued from page 17

the playability of the sand rootzone playing fields. I caution you to leave this technical work up to approved soil labs and soil scientists. I have seen firsthand the failure of sports fields and turf courses when the mix of sand and soils has been done incorrectly. The results can be disastrous – and costly.

Penn State's elite soils program has published guidelines that clearly state the basic soil physics for properly adding loamy soil to sand fields to increase the fields' stability and agronomic effectiveness. The key when adding loamy soils is to blend them with medium-to-coarse size sands. It's when medium-to-fine size sands are blended with finer silts and clays that the results are more representative of concrete than the basis for a sports field. (Those interested in further information on this subject may wish to contact Don Waddington or Andy McNitt at Penn State for a copy of the research.)

The Penn State turf research team also developed for sports fields a traction testing apparatus commonly known as the Penn Foot Traction Machine (or simply as the Penn Foot).

Santa Anita's track is firm without being hard. Firm turf results from developing deep, dense root systems capable of supporting a thick, natural carpet of turfgrass biomass at the surface.

Tests with the Clegg Hammer and the Penn Foot provide a comparative means of gauging a field's playability in terms of hardness and traction.

Demand Proof!

Many new products and companies have entered the arena of field design and construction, and some old systems have been reworked. One must look clearly at hard scientific research and data to evaluate their effectiveness. Too many fields are being constructed and failing due to a company not doing its homework and attempting its research on playing fields at the expense of the end user, the athlete. Research followed by field trials should be standard protocol before any product is used on sports fields.

Another problem is inappropriate or shoddy construction performed by inexperienced landscape contractors.

Demand experience of those who are doing the critical stage of building your fields.

Limiting Liability

Those of you who attended the Sports Turf Managers Association's 7th Annual Conference and Exhibition in Anaheim, CA, this past January had the opportunity

continued on page 23

Playability

continued from page 18

to hear Floyd Perry of Grounds Maintenance Services speak on the issue of playability versus liability.

Perry not only recognizes the field safety issues but reminds us all that there are a number of procedures or steps we must take "to avoid loss to your organization and formulate protection against liability." It only takes one accident or injury to remind us of how important it is not only to maintain a safe playing field but to document all procedures and be proactive with safety audits. Within many parks and recreation departments, trained personnel are assigned solely to the inspection, documentation and repair of hazards in the parks.

The influx of soccer at all levels of play in the United States has put even more pressure on sports turf managers and administration executives. Increased play creates increased wear and damage to the fields.

It's important not to underestimate the ability of a valid turfgrass cover on a field to increase the cushioning effect and increase the traction available to the athlete.

Field designs and maintenance standards need to be developed to optimize the growth and health of the grass plant. Excellent divot recovery and lateral soil stabilization are critical to heavily used fields. As organizations and professional associations develop field safety standards for field hardness, drainage and tractions, many existing fields and field system designs will fail to meet the new requirements. Liability suits will increase, and facilities will find themselves paying out large settlements if their fields "fall below" acceptable levels of playability.

Before you decide on who will reconstruct your fields and how it will be done, ask yourself these questions:

- Am I creating a future liability?
- Am I creating a hard surface?
- Am I creating an unstable surface if and when turf cover is lost for any reason?
- Am I creating an environment that could be detrimental to root development and turfgrass health?
- Am I creating a "Band-Aid" solution that could develop into a long-term problem. (For example, sod produced on heavy soils [silt and clay] when laid on a sand field will, over time, contaminate the sand profile and can cause field failure.)
- Am I creating a maintenance nightmare that my staff is not equipped to handle?

If the answer to any of these questions is yes, reconsider your options. Seek out the most up-to-date research. Request a needs assessment by a team of professional consultants.

The million dollar price tag associated with field construction today is only a drop in the bucket of the potential costs associated with future liability.

We can provide safe playing surfaces for our athletes and control liability through proper preparation and a proactive, diligent approach to field design and maintenance. ❑

Stephen H. Guise operates a national sports turf management company from his office in Fullerton, CA. He is president-elect of STMA, is an elected member of the STMA's technical review committee, and separately contributes to the ASTM Committee on Natural Turf and Artificial Playing Surfaces.