

Scott Halbrook

deceleration with the presence of turf and with core cultivation.

If the research is conclusive, it could help determine a standard on natural fields.

"The hardness aspect comes into the play of the game," says Waddington. Many players claim, for example, that the evenness of artificial turf allows them to run faster.

### Protective instincts

How much does the field actually affect play? Halbrook argues that players adapt their actions to field conditions.

But, he questions, when kids are put on artificial turf, do they realize they're essentially playing on asphalt, or does the green carpet make it seem like grass? If an athlete thinks he's playing on grass he may lose his natural protective instincts to defend himself in a fall.

"If you're playing basketball in the street, you know you're playing on asphalt," says Holland.

"I can't believe that if Scott knew he were playing on frozen turf or hard packed clay that he wouldn't have put his elbow down," says Halbrook. "When you aerate it loosens the soil, makes it less compacted. The grass is yea-high," he says, signalling an inch or two with his fingers. "You water it to maintain it. Everything you do to maintain a nice green field gives cushion to the field. That also gives

more shock absorbancy. If it's brown, it shows immediately."

If a standard for athletic field hardness is established, all athletes would be aware of the type of surface they are playing on and its degree of hard-

ness, whether artificial or natural.

Athletic field managers, researchers, and artificial turf manufacturers need to work together in establishing such hardness standards. Because one death is one too many. **WT&T**

## AN ACT OF GOD?

You've heard it before. Injuries are beyond your control. But experts tell WT&T that the athletic field manager can make his field safer. Here's how.

by Heide Aungst, associate editor

**A**t high schools and grade schools throughout the country, it's a well-kept secret. Those who dare to whisper the truth are quickly hushed.

"It's an act of God," they're told. God's will.

But injuries on natural athletic fields are not all "acts of God." The truth is that many could be prevented. Injuries are frequently caused by poor field construction, cheap seeding, and haphazard management practices.

Young athletes, at the mercy of "responsible" adults, are falling on jagged rocks, twisting ankles in undulations, and tackling each other on hard, compacted fields.

Penn State University has published possibly the only study dealing with the relationship of field maintenance to injuries. In December, 1984, professors Don Waddington (soil science), John Harper (agronomy extension), Chauncey Morehouse (physical education/director of the Sports Research Institute), and William Buckley (health education), published the study "Turf management, athletic-field conditions, and injuries in high school football."

The researchers evaluated varsity and practice fields at 12 Pennsylvania high schools for soil properties, field surface (undulations, stones, roughness), vegetative characteristics, and maintenance factors. They collected injury data throughout the season. (Only 10 schools turned in complete injury statistics.)

Of the 210 injuries reported, 44 (20.9 percent) may have been caused by field conditions.

Waddington says the study has been criticized for being on such a small scale, but it clearly illustrates that a connection exists between field conditions and some injuries.

The problem results from school administrators assigning someone, such as a janitor, without proper knowledge, to care for a field. Administrators often cite budget restrictions as the reason for failing to hire qualified field managers.

"My attitude is you can't afford not to pay someone," says Dr. Henry Indyk, extension specialist in turfgrass management at Rutgers University. "I can use the same philosophy in hiring a teacher in the school system. An athletic field is a very important part of a kid's education."

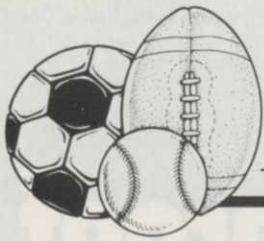
The budget also is to blame for lack of proper equipment and fertilizer.

Some corners can be cut to manage a safe athletic field at low cost. But, other factors should never be neglected.

### Get advice

The first step in either building or renovating a field is to consult a local extension agent. "I don't know how many people know we're here," says Dr. Dave Chalmers, extension agronomist at Virginia Tech. "We're recognized more in rural areas, than urban."

Extension agents can be found at



**Dr. Don Waddington** has studied the connections between injuries and field conditions.



**Dr. Tom Turner** says turf-type tall fescues are highly adaptable in the transition zone.



**Dr. Dave Chalmers** recommends seeking the advice of extension agents.

fore they start because they use the wrong soil," says Dr. Joe Duich of Penn State University.

Soil tests provide the manager with a chemical analysis to see how much fertilizer is needed and an analysis of the soil's physical properties to determine the percentage of sand, silt, and clay.

Dr. Eliot Roberts, executive director of The Lawn Institute, says a good sports field should have about 85 percent sand. The sand promotes drainage, which is also a key to a well-maintained athletic field. But, he warns, mixing in small amounts of sand will act like cement and clog a field.

"Too little sand can be more harmful than doing it right," Roberts explains. "Either go all the way or leave it alone."

For athletic fields which need help, but are hindered by budget constraints, Roberts recommends grading or contouring the surface. This is done with a grooving machine, such as the Ditch Witch.

The grooving should run from goal line to goal line, perpendicular with the flow of the water off the surface (toward the sidelines). The slits should run parallel to each other, every six feet, and be 18- to 24-inches deep.

The soil should then be hauled

any land grant university, which usually has the main agriculture school in the state. Athletic turf seminars sponsored by the local extension service are becoming more popular.

### Rev up community support

Most extension agents consult free of charge which is an advantage to schools with low budgets. Schools that can't get in touch with an extension agent can often get free advice through a local golf course superintendent or landscape contractor. When pinching pennies, borrow equipment from concerned superintendents or contractors.

Community education can be difficult to achieve, but is important to any field managers. Indyk advises that if administrators don't listen, go to the PTA. Concerned parents have a way of getting action when it's a matter of their children's safety.

### Aerate often

Aeration is perhaps the biggest factor in maintaining a safe playing field. Every field, regardless of age, needs aeration to loosen the compacted soil. "Aeration is the difference between failure and success," Indyk says.

"We find the tendency is to not aerify anywhere near enough," says Roberts. He recommends aerifying, about three inches deep, in five different directions, "as often in the spring and fall as it is visually evident that the grass is weak because the ground is hard."

The cores on the field need to be broken to work as a top dressing, which stimulates grass growth. Breaking the plugs also helps keep the field level.

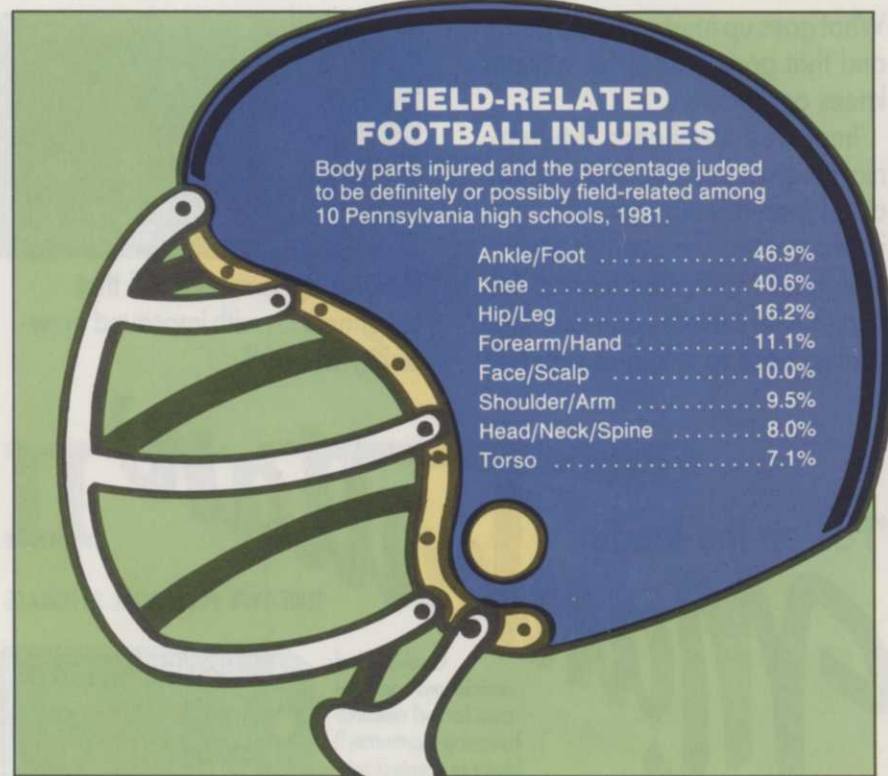
Roberts recommends dragging a

chain-link fence over the cores to break them up. An upside-down harrow will also work (see WT&T "Job-talk" April 1986).

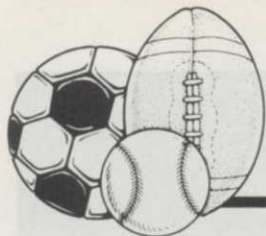
### Sample the soil

While aeration can help many fields, some fields need complete renovation. An extension agent can complete soil tests which are necessary in evaluating the type of maintenance a field needs. Although many managers concentrate solely on turf quality, soil needs to be a primary focus in an athletic field.

"The majority of fields are dead be-







# FOR SAFER TURF....

away, and the grooves filled with sand. The sand helps trap water and carry it into the soil. Roberts says the best time to renovate a field is in early spring or fall.

"There isn't really a good time, since most fields are used year 'round," he says. "But it should be done when the grass grows best. The summer is too hot and it doesn't heal rapidly."

## Seed selection

The variety of seed used on an athletic field makes a difference. Roberts emphasizes the necessity to always choose a name variety. "There's a bunch of these name brands out, and there's not a great deal of difference," Roberts says.

New varieties provide improved insect and disease resistance. Common varieties or blends don't guarantee enough cushion to a field, he says.

On cool-season fields, Roberts recommends using bluegrass (Adelphi, Baron, Touchdown, Glade, Merit, Midnight, Aspen). Bluegrass spreads by rhizomes. It holds together well under use and also forms a good sod. The rhizomes will automatically fill in divots in the field.

Turf-type tall fescue (Rebel, Houndog, Mustang, Olympic, Falcon, Apache) doesn't have the rhizomes found in bluegrass. Roberts describes it as a "clump-type" turf. It needs to be seeded close together. Despite the fact that it won't form sod, turf-type tall fescue does offer improved disease and insect resistance and provides a rugged cover.

Dr. Tom Turner, extension turf specialist at the University of Maryland, says turf-type tall fescues are best to use in the transition zone.

"In Maryland, we're strongly pushing turf-type tall fescues," he says. "You have to irrigate bluegrass in Maryland for it to survive well. It's too hot and humid in the summer."

Turner says Maryland is "in a hotbed of anti-pesticide groups." With improved insect resistance, the turf-type tall fescues offer a good compromise.

Perennial ryegrass (All\*Star, Repel, Manhattan II, Citation II, Fiesta, Pennant, Derby, Palmer) also doesn't spread by rhizomes, but, Roberts says, it is ideal for overseeding, repairing, or renovating a field. Several new varieties of ryegrass contain endophytes, which naturally fight insects.

Ryegrass can be blended with



Dr. Eliot Roberts

In order to build or maintain a good athletic field, Dr. Eliot Roberts, executive director of The Lawn Institute, suggests following these five guidelines:

1. **Land**—First assess the grade/slope of the land.

2. **Soil**—Take core samples to determine the depth of the topsoil, subsoil, and rock layer. Determine the mixture of sand, silt, and clay. To promote drainage, good fields should be about 85 percent sand. (See related story for an easy way to renovate a poorly constructed field) Check the physical properties of the soil such as the particle size.

While looking into the soil, consider how it will work with the installation of drainage, tile lines, and the irrigation system.

3. **Consultant**—Bring in a consultant or local extension agent who is knowledgeable in the design of drainage and irrigation systems. If you haven't determined the properties of the soil, use the consultant to do that at the same time.

4. **Seed**—Select a name seed variety with improved disease and insect resistance. The turf should be able to compete with weeds and take wear. Stay away from common varieties and blends.

Bluegrass works best in cool-season grass areas because it spreads by rhizomes. Turf-type tall fescues are recommended for areas in the transition zone because of insect resistance and drought tolerance. Ryegrasses are good for overseeding and repairing.

Most southern states use bermudagrass on athletic fields. Bahiagrass and kikuyagrass also work in some regions.

5. **Maintain**—After constructing a good athletic field, maintenance should not be neglected. Aeration is the number-one priority for any field. Aeration should be done as often as necessary in the spring and fall, in five directions, at a 3-inch depth.

Irrigation and cultural treatments can be determined by the soil analysis and turf variety used.

If you have any specific questions, be sure to consult your local extension agent.

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bluegrass, but Roberts advises against mixing it with tall fescues. "The ryegrass is more aggressive and tends to colonize," he explains. "It doesn't make for a uniform surface."

In warm-season turf regions, bermudagrass is most commonly used on sports fields. Some gulf coast states use bahiagrass. Several regions of Southern California use kikuyagrass, despite the fact that the Soil Conservation Service has outlawed it because it spreads into agricultural crops.

Centipedegrass won't take the wear of an athletic field. St. Augustinegrass and zoysiagrass get too thatchy and spongy to work well.

To manage a good athletic field, just remember:

## The key to top turf

To manage a good athletic field, just remember GRASS.

**G**et advice from a professional consultant or extension agent;

**R**ev up community support for the needed budgets or equipment;

**A**erate a good field regularly and often; but, if the field needs help;

**S**ample the soil and renovate the field if necessary;

**S**elect seed carefully, using name varieties only;

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*EDITOR'S NOTE: Special thanks to Dr. Fred Grau of the Musser Turfgrass Foundation and Dr. Eliot Roberts of The Lawn Institute for their time and effort in providing the WT&T staff with background information used in this series of articles.*