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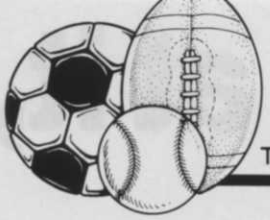

station. His mother works for an optometrist. The Wishards are a typical hard-working, middle class Midwestern family who are well-liked and very active in the community.

When Wishard was injured 11 years ago, the family was not prepared for the hospital bills, the special care required, the anxiety that followed or the weeks, months, and years of learning to adjust to a new kind of life.

Tragedy strikes

On Oct. 15, 1975, the Dakota High School freshman/sophomore football team was going through a normal practice session.

Some people are beginning to question whether the satisfaction of making a desperation tackle or scoring a touchdown is really worth the risk of becoming a paraplegic or quadriplegic.

Wishard recalls the day vividly.

"We had just finished our calisthenics on the Dakota practice field and our coach, Jeff Clark, was conducting what was called the 'hamburger' drill," he recalls. "As the defensive player, I was supposed to jump up (from the ground), turn around and tackle the offensive player. On my first attempt, I slipped on the hard, bare soil surface and by the time I recovered the offensive player had gotten passed me."

The coach told Wishard to try again.

"All I can remember from my second attempt is falling to the ground in pain and calling for the coach. I laid on my back while my helmet, socks and shoes were being removed. I knew something serious was wrong and I think the coach and team manager knew I had a broken neck. When they ran a pencil along the bottom of my feet to see if I had any sensations and I didn't, they called an ambulance."

In the next few hours, he went from hospital to hospital. Wishard remembers seeing his mother at Freeport Hospital.

"When I awoke again, I was being transported to Rockford Memorial Hospital. During the ride, the shock subsided and I hurt real bad. My father was waiting at the Rockford hospital, and I'll never forget the shocked expression on his face. He was as white as a ghost," recalls Wishard.

Wishard soon learned that he had a broken neck, several fractured cervical vertebrae and would probably be a quadriplegic the rest of his life.

Wishard's injury seemed to bring more parents out to Dakota football games during the fall of 1975—perhaps because parents became more concerned or aware of their youth's welfare. They might have wanted to make sure their sons were receiving adequate instruction on the basic football fundamentals.

No better today

The maintenance of football fields in the Northwest Illinois Conference has not been upgraded or improved significantly since the Wishard injury.

Eleven years later, inspection of the Dakota High School football practice and game fields reveals hard, compacted surfaces, several grassy and broadleaf weeds and a maintenance program geared to a weekly mowing. Watering, fertilizing, aerifying, weeding, and the introduction of new turf-type grasses is apparently non-existent.

Minor injuries, and some serious such as broken legs or arms, twisted ankles, broken knuckles and knee injuries continue at Dakota and other conference schools because of rough terrain and poor quality turf.

Two prominent researchers feel that catastrophic football injuries may never be completely eliminated. But a united effort involving coaches, players, administrators, researchers, physicians, trainers and equipment manufacturers is required to identify the problems and then take the necessary preventative measures.

Hope for tomorrow

The purpose of the Sports Turf Manager's Association (STMA) is to provide knowledge and education to improve athletic field conditions throughout the United States, Canada and other countries. STMA is making a concerted effort to get grounds supervisors and personnel to become members and to join forces to combat unsafe athletic facilities everywhere by providing quality fields for the youth and athletes.

STMA would like every athletic field manager to come together to solve problems, learn about new ideas and techniques, and find ways to further reduce severe athletic injuries.

STMA has long advocated that the easiest way to reduce injuries is to provide a well-turfed practice facility and game field. Selecting and using the adapted turfgrass species, fertilizing often enough and correctly, providing adequate water for the turfgrass plant, mowing at the correct height, and aerifying and topdressing to encourage deeper roots, a more resilient surface and a non-compacted soil medium can go a long way toward reducing sports-related injuries.

WT&T

Preventing, not promoting, the injury

by Ken Kuhajda, managing editor

A high school football player suffers a serious injury; not an abrasion or a bump. He tears up his knee.

His parents in the stands don't give a second thought to the condition of the natural grass field. After all, their son is hurt.

But would that player have been injured so seriously if the field were in better condition?

Data on whether a field's condition contributes to an injury is hard to find. At the playground, grade school, and high school levels, there haven't been many studies conducted.

"It's one of those things people just don't want to talk about," says Dr. Eliot Roberts, director of The Lawn Institute. "If there is a tie-in between field conditions and a young person's injury, it's not discussed much. The school systems just have too many other problems."

Adds Dr. Bill Knoop, Texas Agricultural Extension Service turfgrass specialist: "Some people don't want to document the relationship between field conditions and injuries because of the liability question."

Educating turf managers is one of the goals of the Musser Foundation. Ads like this help.

However, one well-known study suggests that yes, the field's condition does make a difference in the number and severity of injuries.

Revealing research

Penn State University performed a study in 1983 that found roughly 20 percent of all football injuries (in four categories) sustained by Pennsylvania high school players could have been "prevented or perhaps rendered less severe by more favorable field conditions."

Penn State extension agronomist Dr. John Harper II notes that most of the injuries judged to be related to field conditions involved the lower extremities (the hip/leg, knee, and ankle/foot).

The study concludes: "The results indicating that one of five injuries may be field-related should be an incentive to construct and maintain high quality playing surfaces."

Another study had similar findings. Carol Ann Comly studied 10 Pennsylvania high schools in 1981 to determine the specific cause of some 35,000 injuries recorded at the schools. (See Chart, p. 26.)

Dr. James Garrick, director of San Francisco's Center for Sports Medicine at St. Francis Hospital, agrees that field condition does make a difference. But he adds an asterisk.

"I suspect it does, but it's awfully difficult to sort out." Garrick suggests there's a give-and-take trade-off on all surfaces.

"People complain about fields being too hard, but a player's cleats don't get down into the hard field so there's less locking and less twisting-type injuries," he says. "But there are problems with bumps and bruises so it's sort of a trade off. By the same token, a good grass field will allow the cleats to escape if you put pressure on the foot," thereby causing fewer injuries, he says.

However, Garrick notes, "I think most people will agree that a well-maintained natural field is the best surface."

Practice fields worse

There's little doubt that improper maintenance is contributing to the problem. Harper and colleagues compared playing conditions on practice and game fields at 12 secondary schools in Pennsylvania and found practice fields were used far more yet maintained far less.

The study reported just 25 percent of the practice fields and 75 percent of the game fields were aerified to relieve compaction.

Little fertilizer was used on either practice or game fields. Not one school reported using herbicides on its practice field.

"We know how to grow the grass to provide the reliable footing needed by athletes," says The Lawn Institute's Roberts. "The bad fields can be corrected without a lot of expense. The fields just need to improve a little each year."

Free information

In Texas, Knoop provides many high schools with football field maintenance information at no charge. He says the injury rate of participating schools has dipped.

"The testimony of the coaches I've worked with indicate that as their fields improve, the number of injuries decrease," says Knoop. "I have several coaches who've not had serious injuries in years because of the good field conditions. Some of the coaches at smaller schools tell me they couldn't put a team on the field because they had so many injuries before they went on our program."

"There's no doubt in my mind" that a field's condition plays a role in injuries, says Comly, now a physical therapist. "As a (athletic) trainer, one of the first things you do is go out onto the field ahead of the team and look for potential trouble spots," she notes.

Adds Roberts: "It's my strong opinion that field condition is a major factor in injuries. The evidence is there, but the problem is not being able to document."

Slow-moving research

Roberts began researching the relationship of good turf to fewer injuries in 1964 while at Iowa State University. Since that time, there have been few studies on the subject.

There is much research available on the increased injury rate on synthetic surfaces. Never has a study revealed fewer injuries sustained on synthetic surfaces, says Garrick.

(The average career span of an NFL player has dwindled from 4.2 to 3.6 years, according to a survey by the NFL Players' Association. Seventeen of the 28 teams play on synthetic turf.) However, research on the conditions of natural turf fields and injuries has moved at a snail's pace. "It's been going on a long time but not much progress has been made. We need to educate the people taking care of the fields, we have to convince people that we need improved fields," says Roberts.

"Even if you eliminate just one percent of the injuries, it's worth it." **WT&T**

For more information...

National Sports Turf Council
Musser Int'l. Turfgrass Found.
Fred Grau, Ph.D., chairman
P.O. Box AA
College Park, MD 20740

Sports Turf Managers Association
Kent Kurtz, Ph.D., exec. secretary
1458 North Euclid Ave.
Ontario, CA 91764

The Lawn Institute
Eliot Roberts, Ph.D., exec. dir.
P.O. Box 108
Pleasant Hill, TN 38578

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1-800-323-3355.

The booklet *Athletic Fields—Specification Outline, Construction and Maintenance* is available from:
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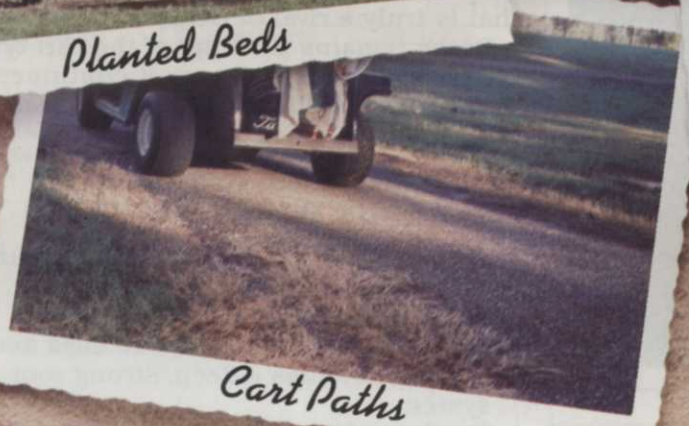

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The ever-popular hydroseeding technique is a fast and economical method of seeding that can save you money.

by Jack Dirksing

Convenient uses for hydroseeding techniques contribute to growth in the green industry.

What started in 1953 as the answer to highway roadside seeding has evolved into a vital means of seeding for virtually any job that requires grass to be grown: landscape construction, private and commercial real estate development, golf course construction, highway roadside development, soil conservation, park construction, and many more.

When the 500-gallon HydroSeeder was introduced in 1958, the progression from seed broadcasting to hydroseeding became a natural step for many landscaping companies.

The addition of hydraulic mulch into the seeding process began in 1961 when International Paper developed Turf Fiber, a "cooked-wood" product. The methods for applying mulch together with seed and fertilizer continued to be refined throughout the '60s. By 1970, "one-step" seeding was an established practice in the revegetation industries.

Today, more landscape contracts are calling for hydroseeding. But, if need be, hydroseeding can be promoted by offering a weed-free lawn installation for less cost than sod. Small, previously impractical jobs can be made profitable by the speed and low labor demands of hydroseeding.

The process is less messy than straw, and hydraulic mulch will not blow away under normal conditions.

The equipment

Hydroseeding is relatively simple. But just as important as the decision to buy equipment is the selection of the right size machine. Consideration should be given to both current jobs and those in future plans. (For tank sizes and coverages, see accompanying chart.)

The hydroseeding process itself is simple.

Jack Dirksing is president of the Finn Corporation.

The Reinco Hydrograsser uses hydro-jet agitation with a grinder/blender feature.

Tank Working Capacity (Gal)	Acreage Per Load	
	With Seed, Fertilizer, Lime	With Wood Fiber Mulch
500	1-3/4	1/6
800	2-1/2	1/4
1000	3	1/3
1300	4	1/3 to 1/2
2500	8	2/3 to 1
3000	9	3/4 to 1-1/2

The materials put in the tank are mixed with water and kept in suspension by agitation. Seed, mulch, and fertilizer are introduced to the tank as it fills with water.

Seed protection

Hydraulic mulch of today is typically a ground wood or paper product. When applied through a HydroSeeder, it serves to protect the seed as it begins to germinate and establish itself.

A harmless green dye is added to the mulch as a marker between loads, allowing the operator to easily identify and judge the amount of material being applied. Additionally, the dye gives a green appearance until the grass begins to germinate.

Most applications call for 1,000-2,000 pounds of hydraulic mulch per acre, depending on specifications, soil conditions, and type of mulch.

Additional products to enhance the seeding operation and satisfy specific needs are available. These can be added to the "recipe" during tank loading. Mulch tackifiers, water retention agents, and fiber length enhancers are typical additives.

The slurry is then pumped to the discharge assembly and directed onto

Reinco's Power Mulcher.

the seedbed by the machine operator. Discharge of the slurry (the mix of all materials) is done either from a tower-mounted gun on the tank or, for a more controlled application, through a hose and a remote valve.

HydroSeeders come equipped with a variety of nozzles to allow the selection of several different spray patterns: wide fan, narrow fan, and long-distance.

A discharge tower is standard equipment on all but the smaller HydroSeeders, where it is not considered necessary.

An electric (or manual crank) hose reel can be mounted on any size Hydroseeder. This allows the convenience of 200 feet or more of hose for jobs not permitting the machine to be close to the work. Most owners prefer the electric reel, as the small added cost of the motor outweighs the time and labor involved in hand cranking.

Few problems

Problems associated with hydroseeding are minimal. However, certain practices must be observed.

Seedbed preparation — The time spent in preparing a good seedbed will yield higher germination and turf density. Highway roadsides, mining reclamation, and landfill seedings require considerably less preparation.

Seed selection and application — Seed selection depends on many variables: width of grass leaf, erosion control ability, drought resistance, disease and fungus resistance, and soil conditions.

In most instances, cereal crop seeds are blended with turfgrasses. The cereal crop or nurse crop seed gives rapid germination and plant growth, protecting the primary grass seed from erosion and the elements. Typically, nurse crop seed germinate in less than seven days while primary grass seed takes at least 14 days.

Rate of seed application is determined by needed turf density and percentage of seed germination. Local seed suppliers are often the best source of information on seed and application rates.

Soil amendments — The selection of fertilizer, lime, and other soil amendments is often overlooked. However, selection is vital to the turf's establishment. The soil's nutrient level and pH additives determine the grass plant's vigor and vitality.

An inexpensive soil test kit can be used to determine the amendments needed. After taking the test, a suitable fertilizer plus pH additives can be added to the HydroSeeder slurry. Again, local suppliers can be a good source for this information.

Moisture retention — After the hydroseeding is completed, regular watering is necessary for the development of healthy turf. This is especially important in arid areas or in summer months when rainfall is limited.

The hydroseeding mulch will absorb and keep water available for the germinating seed. The mulch's ability to hold water varies. Mulches also tend to insulate the seed and soil, protecting it from direct exposure to the elements.

Temporary irrigation on small to medium size projects is rapidly gaining acceptance in areas where little precipitation is expected.

Erosion — Seed and seedbed erosion are probably the most difficult problems to solve, and the most important consideration to make while hydroseeding. Landscape and seeding contractors are constantly faced with washout due to heavy rain. Hydraulic mulches control erosion to a greater or less degree, depending on their derivation and fiber length.

For additional insurance against erosion of the mulch and seedbed, tackifiers or tenacious synthetic fiber should be added to the slurry. Tack

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The Finn Corporation's HydroSeeder.

ifiers bind individual fibers of the mulch together with a water-insoluble, semi-porous film or crust. Tenacious synthetic fibers (mulch fiber enhancers) add fiber length to the slurry and entangle with the fibrillated fiber of the mulch.

The list of erosion control products for use with HydroSeeders grows as new technology is developed. Using an additional product depends, in part, on cost, site condition, rainfall and guarantees of the contract or specifications.

A brief history

Back in 1949, the term "hydroseeding" didn't exist. The technique used to seed was a far cry from today's advanced technologies.

Seeding was seeding, no matter where it was being done...highway or agricultural areas.

On flat areas, scarification and seedbed preparation was followed by the use of agricultural grain drills which placed the seed. On steep slopes, the cyclone hand-operated seeding maching or hand broadcasting the seed were the only methods available.

After planting seeds, a light raking with hand rakes, followed by hand-mulching, finished the job.

Not until the development of the Highway Trust Fund and Federal Interstate programs was it clear that a more rapid, effective, mechanized piece of equipment was needed.

In 1953, Charles Finn of the Finn Equipment Co. developed the first commercially successful HydroSeeder. It mechanically mixed seed, fertilizer, and lime with water, producing a slurry mixture, which was then applied to the seedbed.

The first machine was a two-piece unit consisting of a 1,000-gallon tank set in a small wheelbase dump truck with a separate pumping unit towed behind. As years passed, demands for a more compact piece of equipment were met.

Through the years, hydroseeding has evolved into perhaps the most economic means of establishing vegetation. It's a proven time-saver, labor-saver and profit-enducer. **WT&T**