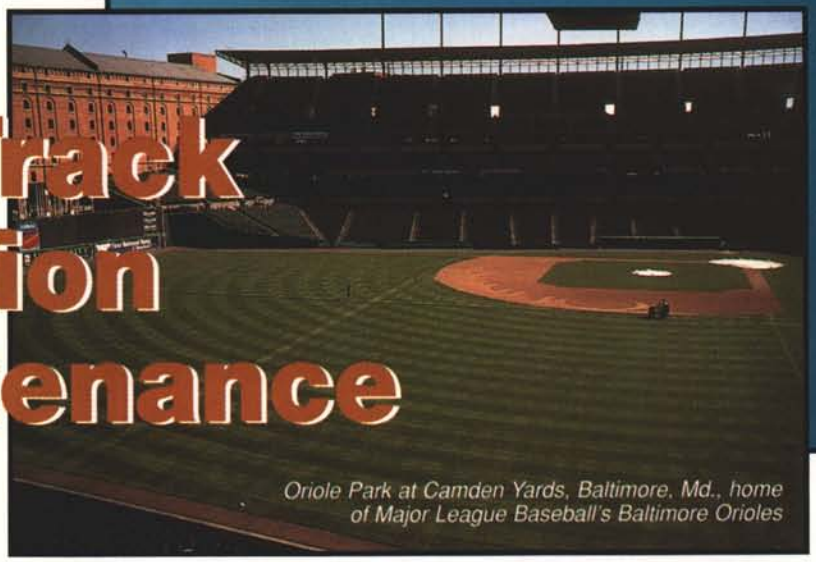
Warning Track Construction and Maintenance



Photos courtesy: STMA

Oriole Park at Camden Yards, Baltimore, Md., home of Major League Baseball's Baltimore Orioles

by Tom Burns and Paul Zwaska

The primary function of a warning track is player safety. As the name implies, it serves to "warn" players that they are approaching a physical boundary such as a fence, railing or dugout. But there are additional benefits to be considered.

We all work countless hours mowing complex patterns and grooming our fields so they look their best. Think of a warning track as the frame for your "Mona Lisa." A well-edged track of a contrasting color will enhance the aesthetic appeal of your field.

A warning track also serves as a utility road. Driving equipment over the same path will lead to compaction and may cause ruts to form, leading to player injury. We have a large amount of tours, pre-game parades and promotions on our field. The track virtually eliminates the on-field wear from these activities.

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The Ballpark at Arlington, Arlington, Texas, home of the Texas Rangers

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Warning tracks may be composed of "natural" or "artificial" materials. Installation and maintenance costs vary depending on the type of track selected and the materials used.

Dimensions

The dimensions of a warning track are largely dependent on the level of play and the size of the playing surface. For a stadium setting, the recommendation would be a minimum of 12 feet in the outfield and 8 feet around the stands. Most Major League tracks are 15 feet in the outfield and 12 to 15 feet in foul territory. This will vary from field to field due to the proximity of the seats to the playing surface. A good rule of thumb is to give the player at least two strides from the field to the obstruction.

Natural Track Materials

There are several materials suitable for constructing a warning track. The first consideration should be texture. By using a coarse or gritty material, the player will feel the change in texture and be warned of the approaching obstacle. This type of material also tends to drain better, which also leads to increased player safety. The most popular type of track material is a crushed aggregate. Granite, cinders, crushed brick and limestone are some examples. There are many fields in

Florida that have tracks constructed of crushed shell. Although the texture and drainage fit the need, the sharp edges and glare of these light colored materials do not make them a good choice.

Size is another important issue. It is important to choose a material with a wide distribution of particle sizes, generally smaller than 3/8 inch. They should also be angular in shape. Sand or soil is often added as a binder. This will allow the material to lock together and provide firm, stable surface.

Cost will be a factor in your choice. Trucking is a significant portion of the cost. Check with local construction supply companies to try to keep transportation costs to a minimum.

Natural Warning Track Installation

The depth of the track will be influenced by factors such as budget and availability of material. A filter fabric is highly recommended if your budget allows. A depth of three to four inches will generally be sufficient, although you may want to increase the depth to six inches if you will have heavy equipment traffic such as forklifts and trucks.

Subsurface drainage is usually not very effective due to the high rate of compaction of the track material. A channel drain along the outside perimeter, when combined with a slight grade, is much more effective. This is especially true when a concrete wall is present. An edging material such as wood or plastic will be helpful along the outside of a chain link fence to prevent washouts. A concrete curb is another option but will be a significant expense.

Once the dimensions have been established, excavate and compact the area. Spread the material and level to the edge of the grass. Make allowances for settling and compact with a roller. You will most likely need to re-grade several times during this process. Soaking with a hose will help in the compaction process and help to keep dust to a minimum.

Maintenance of Natural Warning Tracks

From time to time you will need to add material due to erosion and edging. This is also a reason to have a local source. A topdresser may be used to apply the additional material. Scarify the surface, grade and roll to incorporate the new material.

Regular grooming will help to prevent weeds and keep the track looking fresh. Regular edging will also enhance the look of your new track. A gas-powered edger or string trimmer, used on a regular basis, will help prevent the necessity of using a sod cutter and the constant adding of new material. It is inevitable that weeds will appear at some point. Grooming or using a hoe will control most weeds. Occasionally you may encounter a stubborn weed problem. These can be controlled with non-selective or pre-emergent herbicides.

Artificial Warning Track Construction

Artificial warning tracks are not new to baseball; they have been around as long as artificial turf playing fields. Artificial warning tracks on natural turf fields, however, have only surfaced in the last decade. Oriole Park at Camden Yards was the first Major League park to have natural grass with an artificial warning track.

The typical construction of a porous rubber warning

track begins with a minimum 8-inch base of stone with a 4- to 6-inch drain tile buried down the center of the track. On top of the stone layer is a 2-, 4-, or 6-inch layer of porous or popcorn asphalt. Water can rapidly drain right through the large pores of this asphalt. Finally a 1/2-inch layer of rubber granules coated with a polyurethane binder is screeded to finish grade atop the asphalt. The rubber granules come in a standard red brick color but can be specially produced in custom colors as well.

Artificial Warning Track Maintenance

While the initial cost of this track is more expensive then a natural track, the savings come in long-term maintenance. With an artificial track, it takes only one crew member one hour with a walk behind vacuum to clean it up. The entire track is hosed down every third home game. With a natural track, it can take a couple hours for two crew members to hand rake the trash, peanut and sunflower seed shells and cigarette butts. Then the track has to be dragged and wet down for dust control. After heavy downpours, you often have to replace the natural material that has washed out around surface drains in the track. Over the course of 10 to 15 years, the minimum life of an artificial track, the cost of replacing that material adds up. With an artificial track you just watch the water percolate down through the pores. The foul lines on a rubber warning track only need to be painted once a year.

Protection of Artificial Warning Tracks

There are some practices that must be carefully monitored with a rubber warning track. First, pesticide applications: Always try to prevent any spraying of pesticides on the warning track. Over time it will stain and become quite visible on the track. Always make at least one full boom width application along and parallel to the edge where the turf meets the rubber. This gives you plenty of room to shut off the booms as you come to the end of a pass with your spray rig. The same goes for any granular broadcast applications. Try having two co-workers parallel you on the edge of the rubber dragging a 4 x 8 foot sheet of plywood. This will help deflect the granular materials back onto the turf away from the track.

Most importantly, you must identify early in the life of the track any areas where sediment can flow onto the track from outside sources during a rainfall runoff. Stop these water and sediment flows either before they reach the track or with a trench surface drain right on the leading edge of the track. This should direct the sediment away from the track and into the drain system, preventing clogging of the pores in the rubber over time.

Paul Zwaska is head groundskeeper for the Baltimore Orioles. Tom Burns is director of grounds for the Texas Rangers and an STMA board member representing Category I, those in charge of professional sports facilities. Both are frequent contributors to sports turf-related publications and frequent speakers at turf-related conferences.

Source Book 2000 Update

The 800 number and Website address for AgriBiotech have been updated. The correct 800 number is 800-563-8726, and the correct Web site address is http://www.turf.com.

SportGrass Inc. is moving to a new location. The company's new information is: 6718 Whittier Ave., Suite 220, McLean, VA 22101; 703-288-1800 (ph); 800-808-8800 (toll-free); 703-288-1873 (fx).

The following companies were inadvertently left out of the directory. Immediately following the listings are the categories that each company should be listed under.

Pacific Coast Seed
6144 A Industrial Way
Livermore, CA 94550
Tel: 925-373-4417
Toll Free: 800-733-6432
Fax: 925-373-6855
Email: pacificcoastseed@worldnet.att.net

Categories:
Seed & Sod: turf seed and flowers
Fertilizers/Pest Control: fertilizers and biostimulants

Douglas Industries Inc.
3441 S. 11th Ave.
Eldridge, IA 52748
Tel: 800-553-8907
Fax: 800-443-8907
Website: douglas-sports.com
Email: douglas@netexpress.net

Categories:
Equipment: basepath groomers, turf equipment
Sportsfield Equipment and Supplies: covers—turf/field, padding—backstop/railing/wall

The Pressures of Proper Pump Selection

by Luke Frank

Pump station end-users should consult with a manufacturer's representative to select a pump that meets all their application needs.

Water for large turf areas comes from a variety of sources these days: municipal systems, storage ponds, wells and rivers or some combination. Regardless of the source(s), seldom is water available at pressures sufficient to irrigate large expanses of parks, athletic fields or resort grounds in the limited watering windows grounds managers are expected to deal with.

Pumps and pumping systems are important to delivering safe, sufficient flow and pressure to a large irrigation system. Proper selection of pumps is the basic foundation of an efficient pump station. Even the best pump controls can't manage excess power consumption resulting from improper pump selection.

Pick Your Pump

Generally, if you can procure a water source, you can efficiently deliver it to your irrigation system. Today, five basic types of pumps are used to deliver still greater flows and pressures demanded of modern grounds managers and their irrigation systems:

1.) Centrifugal pumps lift water from lakes or wells and are used as primary irrigation water suppliers. Centrifugal pumps can lift water, but suction/lift capacities vary. These pumps tend to be "loud" because of high motor and pump RPM.

2.) Centrifugal pumps with positive suction pressure are used as pressure boosters from above-ground reservoirs. They also tend to be a bit noisy.

3.) Vertical turbine pumps also are primary irrigation water suppliers, lifting water from lakes, wells or rivers and boosting pressure into irrigation systems. These stealthy pumps, using multiple stages, can run at lower RPMs and are considerably quieter.

4.) Submersible pumps used as primary water suppliers lift water from lakes, wells or rivers and also are quieter.

5.) Vertical turbine barrel pumps are used as high-pressure boosters from above-ground reservoirs in pipelines.

Pump station end-users should consult with a manufacturer's representative to select a pump that meets all their application needs. Photo courtesy: FloBoy Pumping Systems.

Efficient Operation, Lower Flows

An irrigation system operating at the lowest possible cost must use pumps with a high efficiency at minimal flow rates. To maximize efficiency, constant-speed systems use multiple pumps of various sizes. Variable-speed drives use fewer but larger pumps, with the drive reducing pump speed to match any reduced flow requirements.

By selecting pumps with flat curves, less energy is required at reduced flow rates for either constant-speed or VFD systems. Generally, there is little difference in energy requirements between constant-speed and VFD stations, when equipped with properly selected flat-curve pumps. Proper pump selection means lower power costs.

Irrigation Controls and Efficiency

Many computer-controlled irrigation systems include a flow-manager feature, which enables sprinkler valves to activate out of normal operating sequence. A total flow "ceiling" is entered into the computer which allows as many sprinklers to operate as possible to meet, but not exceed, this flow ceiling. During an irrigation cycle, each sprinkler valve will be activated for its total runtime as programmed into the computer, but it might not operate in the programmed sequence. The effect is to maximize the time in which the pumping station operates at peak efficiency, while also closing the watering window.

Some watering at reduced flow rates is still necessary, but flow-manager systems significantly reduce flow imbalances and wear-and-tear on systems.

Selecting Pump Stations

No single type of pump station is best for every application, nor is there a single manufacturer that can meet every customer's needs. Each site is unique in its character, so engineering

the "ultimate" pump station takes a team approach. Those responsible for the cost, design, manufacturing, performance, installation, and maintenance must work together to make the best station selection. Following are the roles for those involved in the specification process:

Owner, Architect, Consultant

- Determine first that there is adequate water available for the irrigation system.
- What and where are the water sources—wells, lakes, municipal water, streams or a combination of sources? Will recycled water be used and what is its quality?
- Determine the availability of power sources to the pump station. Where are they located on the site and what are their costs?
- Determine the site requirements at the pump station's location. Does it need to be enclosed and what type of enclosure complements the site? What about noise? Should it be accessible for servicing?
- What type of stations are needed? Working with the owner, the irrigation consultant will determine whether there's adequate water, the type and location of the stations and the power or fuel to be used.
- What about the irrigation management personnel and their input?
- Establish pressure and flow rates, and the irrigation cycle times those rates require during high and low seasonal demands.
- Identify special filtration or fertigation injector equipment needs.
- Specify maximum station power at flow rates of 25 percent, 50 percent, 75 percent and 100 percent.
- Select and specify stations that can be provided within the budget.

Grounds Manager, Irrigation Personnel

- Ensure the pump station(s) will be easy to maintain.
- What spare parts should be kept?
- Preventive maintenance schedules and considerations.
- What service is available from the manufacturer and local consultants; how quickly can service personnel respond; and what are the service providers' charges?

Installation Contractor

- Understand site preparation requirements.
- Formulate plan to immediately notify all parties of any construction schedule changes.
- Coordinate pump station delivery, installation, start-up, and calibration.

Manufacturer

- Integrate input from owner, architect, irrigation consultant, irrigation management personnel and contractor to design, build, deliver (on time) and install a station within a budget.
- Provide comprehensive and easily understandable installation, operation and maintenance manuals to help with preventive maintenance schedules and troubleshooting procedures.
- Promptly respond to and satisfy operators' requests for after-sales assistance.
- Provide a local service capability and inventory of spare parts for both preventive maintenance and emergency repairs.

• Maintain communication with station operators regularly after the sale. Advise owners and operators of new developments that might improve station performance or lower operHating costs.

A Little History

Used to be that large turf areas (100-plus acres) were sprinkler irrigated, dragging cumbersome hoses and sprinklers around the site. Many of these early irrigation systems used municipal water supplies with adequate pressure to operate the sprinklers. Unfortunately, the coverage was anything but uniform, labor expenses were high and turf quality was "spotty."

As grounds managers began punching in quick-coupler systems, sprinkler uniformity and turf quality improved dramatically, but irrigators began demanding more water at higher operating pressures to attain the desired coverage in a shorter watering window. Pumps were added to boost pressures and add valves to an irrigation set. As the price of municipal water steadily rose, alternate sources of irrigation water were developed, like wells and surface water. In order to transport water from these newer sources, pumps were required. Thus evolved the large-scale use of pumps and ultimately pump controls that we use today.

Out of Control

As systems grew larger with several different controllers and irrigation cycles, the pump start system became unwieldy, because of the added expense of extensive wiring needed for each satellite controller to "communicate" with the pump station.

Consequently, irrigation control systems were developed that enabled pumps to activate on a small pressure drop in the irrigation system, maintain a constant system pressure using main control valves over a wide range of flow rates, and stop pumps as the flow decreased. The need to wire controllers to the pump was eliminated, and irrigation system mainlines were kept under pressure ready to deliver spot water at any time. The system minimized pipeline breaks resulting from water hammer and pump cycling. These systems are still installed and used successfully today.

Variable speed pumping systems appeared on golf courses nearly 30 years ago. These early systems were very expensive, and not very efficient. About 15 years ago, new technology emerged—the variable-frequency drive (VFD)—and quickly became cost competitive. Numerous pump station manufacturers developed and marketed VFDs. Early claims regarding efficiency and power cost savings helped these systems gain wide acceptance with owners, operators, and irrigation designers. Another appealing feature was the ability of some VFD control systems to accelerate a pump to its operating RPM gradually, reducing starting pressure spikes on the irrigation piping system. With improved VFD drives and fewer equipment failures from pressure surges, VFD systems are as reliable as constant-speed units.

There are numerous considerations important to the selection of pumping stations. Have a comprehensive understanding of your site, your sources and your personnel before you begin to "shop." Proper pump selection creates kinder, gentler irrigation systems performing at peak efficiencies. Use the team approach and share in the glory.

Photos courtesy: STMA

Chapter programs, such as on-field workshops or site tours, require countless hours of thankless work.