



Sports Field Maintenance with Reels and Rotaries

by Dale Getz, CSFM, The Toro Company

The art and science of sports field maintenance requires the expertise of a knowledgeable turfgrass manager along with the care and dedication of the entire grounds staff. Previously, as athletic facilities manager at the University of Notre Dame, I have experienced maintaining fields for some of the best athletes, the most discriminating coaches and the fans, including the television audience. Selecting the appropriate mowing equipment to maintain high-quality, safe and aesthetically pleasing fields requires knowledge of turfgrass growth, understanding mowing techniques and knowing the field specifications

for the sport.

Turfgrass Growth

An understanding of the physiological aspects of grass is essential in turf maintenance. During my 17 years at Notre Dame, one of the biggest agronomic challenges was the diversity of fields I managed.



Ready for game time! The Notre Dame Stadium field awaits the fans. Photos courtesy: Dale Getz

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Each field had its own soil characteristics, species composition, microclimate and nutritional requirements. Each field, therefore, had to have its own personalized management plan. For example, the football stadium was a sand-based field requiring small amounts of nutrients spoon fed frequently to reduce leaching. The soccer complex was a clay loam with a solid clay barrier about 18 inches below the surface. The field had more nutrient holding capacity (CEC) but was very difficult to manage under wet conditions. The remainder of the nearly 80 acres of sports turf at Notre Dame fell somewhere in between.

Remembering what we learned in science class, all living organisms are made of small units called cells. Cell division and cell enlargement result in an increase in the size of the plant. As the cells at the tip of a root actively divide and then elongate, the root grows deeper into the soil. All shoot growth, on the other hand, is initiated at the crown or the base of the plant. If the crown is injured, the plant may not recover from the damage; therefore, mowing at extremely low heights of cut can be injurious or even cause turfgrass death.

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The fans never see the varied mowing techniques necessary to keep the turf healthy.

Food is manufactured by a complex series of processes known as photosynthesis. Energy provided by sunlight causes carbon dioxide and water to combine and form the food source for the plant. The food is used by the plant to produce energy and build cells and tissue. Energy is required for plant growth and development. The release of energy is the result of a process known as respiration. In turf management, respiration results in growth. A balance between fuel production (photosynthesis) and fuel consumption (growth via respiration) must be maintained and is critical when developing mowing and other management strategies (see table 1).

TABLE 1

Factors that encourage excessive respiration

- Over-fertilizing with nitrogen
- Mowing
- Wear, insects and diseases
- Mid-summer conditions
- other versions shows Mowing, wear and disease together as the second bullet point

Factors that limit photosynthesis

- Close mowing
- Water and temperature stress
- Soil compaction

Mowing

The mowing schedule will be determined by many factors, including the geographic location of the field, the turfgrass species, the sports played on the field, the team schedule, staff availability, height of cut and weather conditions. At Notre Dame I would meet with coaches, study team schedules, assess the weather conditions, analyze

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existing turf conditions and efficiently schedule mowing into the mix. This could involve mowing on weekends, early in the morning, late in the afternoon and even under the lights at night if necessary to produce the best results.

The selection of the most appropriate height of cut is influenced by each grass species' or cultivars' recommended mowing height range. This height is determined by the growth habit of the species (see table 2). The cardinal rule is to cut

no more than 1/3 of the grass blade at one time, and remember, grass grows back after mowing because the growth tissue or crown is located beneath the path of the mower blade or reel. The tissue that is cut off is the oldest part of the leaf.

Anytime the grass is mowed it is injured. These injuries provide a place for disease-causing fungi and other pathogens to enter and infect the plant. Mowing with dull blades or reels will cause damage to leaf tissue, causing the wound to heal more slowly; therefore, repeated mowing with a dull blade seriously weakens the turf.

It is important to cut the grass in a different direction each time it is mowed. Turfgrass tends to grow or lean in the direction it is mowed. Repeatedly mowing in the same direction can cause it to grow horizontally creating a microclimate conducive to diseases, insects and excessive thatch accumulation. One exception, though, is grass that is intentionally mowed in one direction to prepare field striping patterns for a big game or major event.

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TABLE 2

The following chart lists various grass types and the optimum height of cut for each species.

Cool Season—

Cool season species grow quickly in spring and fall, but slowly in the summer.

Grass type

Optimum Height of Cut

Kentucky bluegrass

1 - 2 1/2"

Annual bluegrass

1/4 - 1"

Perennial ryegrass

1 - 2-1/2"

Tall fescues

1-1/2 - 2-1/2"

Warm season—

Warm season species grow best in hot weather.

Grass type

Optimum Height of Cut

Bermudagrass

down to 1/8"

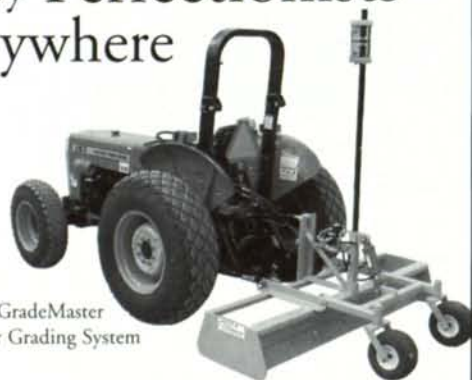
St. Augustine

down to 3/4"

Zoysiagrass

down to 1/4"

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Field Demands

The main goal of a turfgrass manager is to give coaches, players and fans what they want—safe, playable and aesthetically pleasing fields, especially if the game will be televised. The turfgrass manager is particularly challenged when maintaining a multiple use field. Many venues are used for football and soccer in the fall and lacrosse and/or field hockey in the spring. Picnics and barbecues are common and some are used for marching

band practices. Then there is the ultimate field demand, although I personally have never had to endure one—a rock concert in the middle of summer when the turfgrass is already under stress and the playing season is a month away!

Field Aesthetics with Rotarys and Reels

Each sport has different objectives when it comes to mowing heights and aesthetics on the field. Baseball infields are sometimes mowed shorter than the outfields and field hockey and soccer generally prefer shorter heights of cut than football, rugby or lacrosse. Baseball and soccer have led the pack with interesting field striping patterns. Striping can be accomplished with rotary or reel mowers, although reel mowers are used more often for the task. Reel mowers are equipped with a full roller behind the cutting unit to lay the grass down and provide the grain necessary for the pattern.

Rotary mowers have blades that rotate horizontally at high speeds. They lay the grass down slightly but

do not provide as much grain as reel mowers unless they are equipped with a full roller. The sharpened edges at the ends of the blades cut off leaf tissue by impact. Rotaries will cut from 3/4 to 4 inches. Reel mowers, in contrast, have blades attached to a cylinder, which is the reel. As the reel rotates, leaves are pulled against a sharp bedknife and cut off. The blade and the bedknife create a scissors-type cutting action leaving a clean cut, which heals quickly. Reels can cut from 1/8 to 2-5/8 inches although quality of cut decreases above 2 inches. Rotary and reel mowers each have qualities for specific situations.

Reel mowers provide a consistent, higher quality of cut, particularly at lower heights. The scissors cutting action is better for the health of the plant, when the reels are kept sharp. The key aspects of reel mowers are the precision cut they deliver and the excellent pattern or striping on fields.

Rotary mowers are more versatile at higher levels of cut. Some new rotary mowers have a full roller behind the deck to provide field patterns. Rotary mowers are generally less maintenance intensive than reel mowers and are highlighted for their productivity.

Striping has become more than a way to mow grass. It has become a scientific art that can enhance the big event or ball game. David Mellor, director of grounds for the Boston Red Sox (and previously assistant director of grounds for the Milwaukee Brewers) is author of *Picture Perfect, Mowing Pattern Techniques for Home Lawns, Landscapes, Athletic Fields and Golf Courses* soon to be published by Sleeping Bear Press/Ann Arbor Press. In his book, one of the pictures he included is of a Toro Groundsmaster(3500-D as a new rotary mower that can be used for striping.

The great debate will continue. Some turfgrass managers will only use reel mowers, some swear by rotary mowers and others will use a combination of both. The goal is to determine the grass type, desired height of cut and the sport played on the field to make the grass optimum for the situation. With all these things considered, you will score points with the coaches, the players and the fans.



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Table 3

Bottom line considerations—criteria for the selection of the mower

Quality of cut: Always use the equipment that will give the best quality of cut required for the sport. My general rule for sports turf maintenance is: Below 2 inches a reel mower provides a better quality of cut and above 2 inches a rotary mower is generally preferred.

Height of cut: The height of cut is determined by the turfgrass species, the sport, the environmental conditions and the coaching staff.

Maintenance: It is essential to the health of the grass and to achieve the best quality of cut to keep the blade or reel sharp. Reel sharpening is a more time intensive and costly procedure than rotary blade sharpening. Reel sharpening should be done at least once each year in the North with periodic backlapping performed. Reel sharpening should be done 2-3 times a year in the North with periodic backlapping performed.

Expense: Reel mowers are typically more expensive than rotary mowers, but there are certain instances in which a rotary mower may be higher priced, however, the maintenance on a reel mower is more expensive.

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