# More Effic
# Save Labor,

The Ransomes T-16 54-inch rotary is highly maneuverable.

To the casual observer, or even to the dedicated sports fan, mowing sports turf is no big deal. No one places a bet on a game based upon the type of mowing equipment the turf manager uses.

But, behind the scenes, there is a growing awareness of the impact of mowing equipment on the condition of natural turf fields and the cost of field maintenance by administrators, turf managers and even players. This awareness is not limited to management of professional stadiums. Some of the greatest changes are taking place at the college and park levels.

Just as golf course superintendents use specialized mowers for different turf areas on their courses, park superintendents and field managers for educational institutions have begun to recognize the need for separate mowers for utility turf and sports turf. They have begun to realize that a quality mower is as important as the lights, bleachers, fencing and scoreboards on these fields.

Managers of sports facilities are also discovering that specialized mowing equipment not only allows them to improve the appearance and condition of their turf, it allows them to control labor costs through increased productivity. Equipment manufacturers have been lowering labor require-


The Jacobsen HR-15 has a cutting width of nearly 16 feet.


The Toro Reelmaster 216 has a hydrostatic transmission and six-foot cutting width.

John Deere is introducing a series of reel mowers this winte

# ent Mowers Boost Quality


**An air-injection system helps Cushman's Front Line rotary pick up wet clippings.**

ments for turf management for decades.

Much of this labor-saving technology came from developments by agricultural equipment companies, says Bill Kinzer, turf products manager for Jacobsen. He points to the use of hydraulics to power blades and lift cutting units, four-wheel drive for better traction and the growing use of diesel engines.

Dr. Jim Watson, vice president of The Toro Company, has been advising his company for more than 30 years on how to help institutions reduce their labor costs while improving turf quality. He has been a strong proponent of lighter-weight mowers, more blades on reels for a finer cut and increased maneuverability.

These improvements all have their price. But the savings in labor have exceeded the increased cost of the equipment, especially when amortized over the life of the mower. For example, Tampa Stadium has reduced the size of its crew from 25 to 13 in the past four years. Part of the staff reduction was made possible by replacing old walk-behind mowers with a triplex reel unit for the stadium field and a 52-inch out-front rotary for the practice fields and parking lot turf. "We cut mowing time by two-thirds and now have better turf than before," grounds manager Jim Salemi states.

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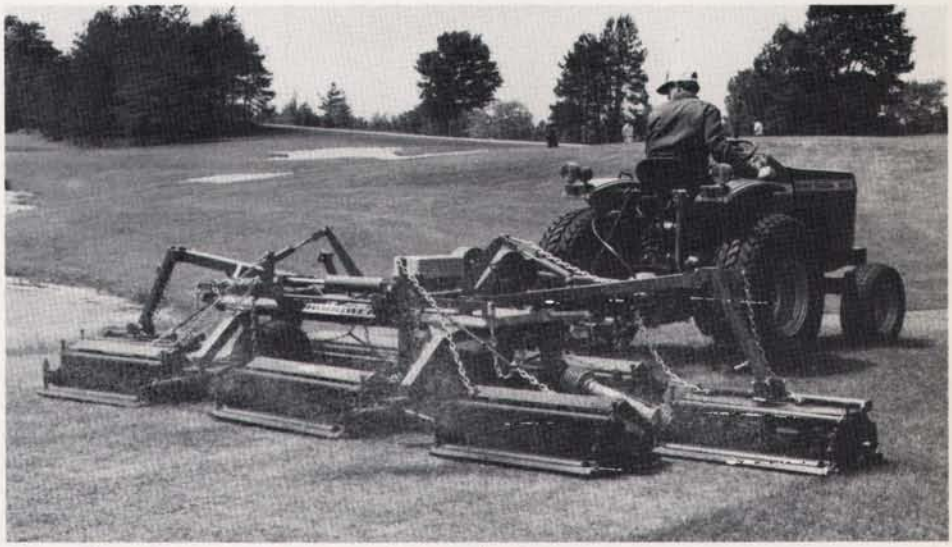
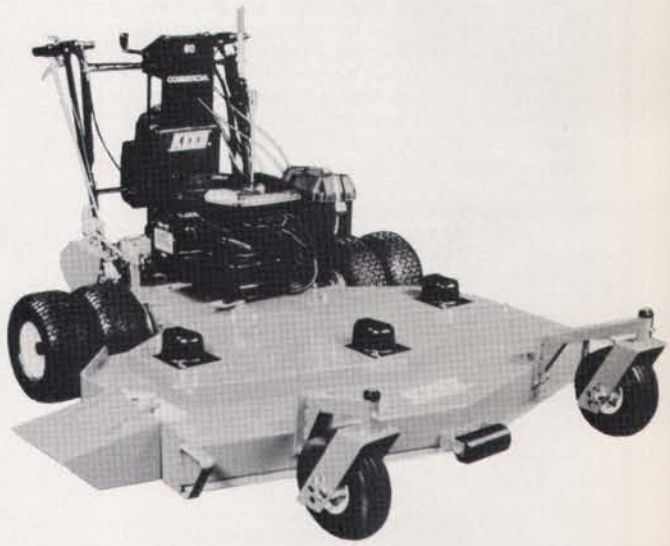


**Brouwer's seven-gang, mechanical -drive reel mower.**


**Bunton's Multi-Trac cuts a 16-foot swath but is only eight-feet-wide during transport.**



**F.D. Kees walk-behind rotaries are economical and maneuverable.**

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Salemi is a good example of today's sports turf manager. He is responsible for more than playing fields. His mowing needs are best met with a combination of mowers. His stadium field now receives the high-quality cut of a reel mower, and utility turf areas are quickly cut with a highly-maneuverable rotary tractor. In addition to the stadium, the crew maintains a 6,000-seat baseball stadium, a four-field spring training complex used by the Cincinnati Reds, and an all-grass parking lot big enough for 10,000 cars.

"It's not just stadiums that are buying specialty mowers," reveals Stan Kinkead of National Mower Company. "Parks, school districts and colleges are buying reel equipment to mow their best fields and using rotary and flail equipment for everything else. After all, a reel mower for a flat field doesn't really need all the features of a golf course reel mower. Because it runs only a few hours each week, it will last longer and require less maintenance."

Dick Lehman, vice president of Ransomes, Inc., says turf managers in most cases want to pick up clippings when mowing sports fields. "The pattern made by the mower on the field becomes more important. The operator takes pride in how straight he can make the pattern in the outfield of a baseball field or between the five-yard lines of a football field. He's not just cutting grass."

Reel mowers have come a long way since gangs of them were pulled by a team of horses in the early 1900s. You knew the horsepower of your mower by counting the number of horses attached to the harness. The blades of these reels were turned by gears driven off one wheel of each unit. The faster the horses walked, the faster the blades turned.

The tractor took over for the horse in the '20s. Blades were still wheel-driven. The Worthington Mower Company and The Toro Company designed special tractors just for mowing parks and golf courses. The reels hung from arms attached to both sides of the tractors which could be raised for transport. But the simplicity of the tow-behind gangs and the availability of small agricultural tractors made the tractor-drawn gang reel mower dominate turf mowing for the next 20 years. In fact, these same mowers are used regularly on many parks and golf courses today.

As small, internal-combustion engines were perfected, they were used to power one- to three-reel, walk-behind mowers. The combination of walk-behind and tractor-drawn reel mowers served parks, schools and golf courses for years.

The rotary mower concept, originated in the late '30s, took years to catch on at the commercial level. Rotaries offered simplicity and weighed less than reel mowers. But it wasn't until the '60s, when rotary cutting units were mounted underneath small tractors, that they began to assume a significant role in commercial turf maintenance. In the same period, the walk-behind rotary mower was quickly replacing the reel mower for homeowner use.

During the late '60s, mower manufacturers started to explore the potential of driving reels and rotary cutting units with the power takeoff (PTO) of small tractors. Belly-mounted, belt-driven rotary tractor mowers were limited in maneuverability and interchangeability. Agriculture had demonstrated how one tractor could do several jobs by utilizing the PTO. Farmers were the first to have PTO-driven flail and rotary cutting units, but they were attached to the rear of the tractor where the operator could not see them.

The first mechanically-driven five-gang reel mowers were introduced in the early '70s. The manufacturers quickly discovered the weaknesses of the standard tractor for mowing equipment. They wanted the cutting units to be in front of the operator and not behind him. They wanted to be able to turn mowers sharply so they would not leave uncut areas at the end of rows. They wanted to pick up cutting units easily for transport. They also wanted a tractor with a lower center of gravity that would be more stable on slopes.

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By reinventing the tractor, mower manufacturers opened up a floodgate of new products. By attaching more cutting units to the "turf tractor" they could increase mowing rates from ten acres per day to more than 30 acres per day without changing the quality of cut. All types of mowing units could be attached to the tractor. Rotary and flail mowers were offerred as options to reel units.

In the midst of this flood of technology, two problems surfaced. The mechanical drive from the tractor to each cutting unit was a series of gearboxes, pulleys, belts and drives. This linkage was sometimes awkward and added weight to the mower.

The first answer came in 1974 from a British company which had just begun to export reel mowers to the U.S. Ransomes had replaced all these parts with three flexible hoses to each cutting unit. A pump, driven by the tractor, circulated hydraulic fluid through these hoses to a small motor on each cutting unit. All the previous gears, pulleys, belts and drives were eliminated, along with their weight.

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The second problem was more something to live with than something to correct. Engineers determined it took twice as much power to operate a rotary or flail unit as it did a reel. To provide more power for rotary tractor mowers in the midst of the energy crisis, manufacturers started to build units with diesel engines. Diesel fuel at the time was less expensive. The other benefit, which really has had a more lasting impact on the mower market, is that the average diesel engine will last nearly three times longer than a similar horsepower gasoline engine.

The turf tractor has continued to grow in size and cost. Seven-gang reel tractors can mow nearly ten acres per hour and cost more than $45,000. Rotary and flail versions are in the same ballpark.

While the turf tractor was getting bigger and bigger, the walk-behind rotary and the smaller riding rotaries were rapidly gaining reputations for efficiency. In both cases, the key was maneuverability.

By adding a clutch or brake to both wheels of walk-behind rotaries, manufacturers were able to let cutting decks expand to 52 inches while still maintaining maneuverability. The simplicity of the mower, and the optional

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sulky, provide an economical way to mow up to 16 acres per day.

At the same time, advances in steering, transmission and hydraulics brought new meaning to the term "zero turning" radius. More comfortable riding mowers closely approached the maneuverability of the walk-behind rotaries. Hydrostatic drive enabled operators to control speed and direction with one pedal. No shifting was necessary. The units have become so maneuverable that trim mowing around plant beds, trees and structures has been reduced.

Professional rotary mowers generally can mow as low as one inch or as high as four inches. If blades are kept sharp the quality of cut is acceptable for most turf. Rotary blades are also the easiest to sharpen, says Jacobsen's Kinzer. "One bolt is all you have to deal with to remove a dull blade and replace it with a sharpened spare blade," he points out.

Rotary blades should be removed for sharpening for obvious safety reasons, but they also must be balanced after sharpening. Unbalanced blades vibrate when spinning since centrifugal force is greater on the heavier end of the blade. This can lead to premature failure of bearings and cause bolts to come loose.

Another problem with rotaries is the distribution of clippings and debris. Manufacturers must enclose the blades to prevent rocks or debris from being thrown by the blades at nearby people or structures. All clippings and debris are directed out a chute and downward. Although this makes the mowers safer, it can cause the mower to leave windrows of clippings on the freshly-mown turf, especially when the grass being cut is wet.

To solve this problem, manufacturers are offering clipping-collection systems which utilize the air circulation generated by the blades to blow the grass into a collection device attached to the mower. Cushman-Ryan has developed an air-injection system which increases the suction effect of its collection system for wet clippings. Dane Scag, president of Scag Power Equipment, has designed channels underneath his rotary deck to maximize the air flow carrying the clippings.

Recently, Jacobsen introduced a fine-cut flail mower to provide a different option to distribution of clippings and debris. These mowers utilize a large number of L- or T-shaped blades which pivot on a spinning rod. Like a reel, all clippings are spread evenly behind the blades. If a blade hits a rock or other solid object, it will give and pivot out of the way instantaneously. For this reason, flail mowers are safer in places where people are around during mowing operations.

The problem with flails has been the quality of the cut. Flails, like rotaries, cut by tearing the leaves of the foliage. However, the rotary blade is easier to keep sharp. The Jacobsen flail utilizes more blades which are distributed in a new pattern on the rod and specially-treated to stay sharp longer.

Sharpening reels and flail blades is more involved than sharpening rotary blades. Special equipment is required in both cases. On the other hand, reels should stay sharp longer than rotary blades. "Technically, reel mowers are self-sharpening," states Kinzer. "If the reels are properly adjusted with the bed knives they should stay sharp for the entire season without grinding."

If manufacturers succeed in developing flail blades which stay sharp for a full season, then these mowers will be more practical for practice fields and utility areas. Kinzer says a device, much like a hand-held knife sharpener, has been developed to sharpen flail blades without removing them. The shear number of blades on a flail mower puts it at a disadvantage for providing a high-enough quality cut for stadium or primary sports fields. Its safety when used on utility turf remains unsurpassed.

The big challenge in sports turf mowing today is matching efficiency and labor savings with quality of cut. Reel mowers will provide the best appearance to turf since they cut with a scissor action. Reels are not adept at cutting stemmy weeds or grass that has grown more than six inches high, but they will cut well-maintained turf lower than rotaries. A greens mower can cut below one-eighth inch. Many colleges and professional fields are cut as low as one-half inch with triplex reel mowers. A baseball infield might be cut at three-quarters inch and the outfield at one-and-a- half inches. In many cases, coaches and athletic directors use mowing height to have some control over the game.

John De Matteo, agronomist for Lofts Seed, Inc., says mowing height should be determined by the type of grass, amount of use and the level of maintenance. For limited-use, well-maintained Kentucky bluegrass fields, De Matteo says mowing height can go below two inches if a reel mower is used. The same field with perennial ryegrass can be mowed below an inch with a reel mower.

For limited-use, low-maintenance perennial ryegrass, Kentucky bluegrass or turf-type tall fescue fields, De Matteo does not recommend mowing below one-and-a-half inches. For high-use fields with either low or high maintenance, the cutting height should not fall below two inches.

You can see that mowing is not as simple as it once was. A number of factors come into play—labor savings, maintenance level of the field, type of turfgrass, desired height of cut, amount of field use and equipment maintenance. Since most sports facilities have a variety of field situations, the chance that one type of mower fits all is remote. Managers of athletic fields and parks are coming to the same conclusion as golf course superintendents: that a combination of mowers is needed to maintain quality turf efficiently.