# CHECKUP FOR THE NEW MILLENNIUM:
# *Does Your Equipment Fleet Make the Cut?*

*Meeting player expectations requires the right tools.*

**by MATT NELSON**

IF YOU'RE A GOLF COURSE official or course owner who has been involved in purchasing golf course maintenance equipment, you might think that the Starship Enterprise is docked at the maintenance facility. The cost of golf course maintenance equipment is high, but when considering present maintenance standards and player expectations at many golf courses, the cost of various equipment items really is not so surprising. Putting greens commonly are mowed at ⅛ inch or below. Tees and fairways are being cut at ½ inch or lower. Bunkers (once known as hazards) are raked with unbelievable regularity, topdressing sand is applied every week or two at rates so light that golfers can't notice, specialized products are applied at rates of a few fluid ounces per acre or less, and cultivation is performed in a manner intended to minimize disruption to play. Has golf course conditioning gone haywire? Regardless, the cost of meeting today's player expectations is high, and if the course maintenance staff does not have the tools to get the job done, players should stop making unfounded comparisons to other golf courses.

There are several essential aspects of remaining competitive in the golf market. Customer service, location, golf course design, and conditioning likely top the list. Service and maintenance are the two that matter every day, and it is the latter that this article addresses. Proper conditioning of the golf course depends upon the skill and expertise of the golf course superintendent, a well-funded budget, and the necessary tools to get the job done (3). Given the exacting specifications of present-day playing standards, having the right tools for the task at hand separates the good, the bad, and the ugly (6). Following is a sample equipment inventory for an 18-hole golf course, designed to provide high quality playing conditions. This list may identify shortcomings in your equipment inventory that could be a major limiting factor in realizing the desired playing conditions at your golf course. Regional differences and special circumstances will necessitate some variation from this sample.

*Quality aeration equipment is a must. Having the proper equipment allows the necessary practices to be completed in a short time and with the least amount of disruption to play.*

### Mowing Equipment

Mowing is the most routinely performed cultural practice on the golf course. The quality of cut clearly has a major influence on the playing surface, and it also can significantly affect the health of the turf. A dull mower can increase disease incidence, adversely affect the plant physiologically, and increase water use. Heavy mowing equipment imparts wear injury to the turf and causes soil compaction, both of which are commonly observed problems. Properly selected, dependable mowers are a must for good turf.

***Greens:*** Six to eight walk-behind putting green mowers are most common. If you do not walk mow the putting greens – strike one. Walk mowing has consistently demonstrated the best playing conditions and the healthiest turf (5). Grooming units should be included to lightly vertical mow when conditions are favorable (16). At least two triplex mowers for greens are necessary for verticutting, weekend, or special occasion mowing, and for mowing following topdressing applications. Three or four triplex mowers are needed for the greens if you cannot walk mow.

***Collars:*** Two walk-behind mowers for the collars should suffice. A distant second is mowing collars with a triplex mower that also can be used to mow tees and approaches. Fairway mowers should not be used to mow collars. Remember, the heavier the machine, the more the turf is damaged.

***Tees:*** Two or three triplex putting green mowers should be part of the inventory for tee mowing. Tee mowers also are commonly used to mow approaches. This strategy prevents heavier fairway units from turning in this critical play area. Some of the best courses go one step further. Tees, collars, and approaches at these courses are walk mowed with wider walk-behind mowers, usually up to 26 inches

*A dependable fleet of lightweight fairway mowers is needed for a good turf surface.*

in width. Four to six of these walk mowers would be necessary.

***Fairways:*** The advent of lightweight fairway mowers over the past 10 to 15 years truly revolutionized the management and playabilty of fairways at golf courses across the country. In fact, many golf courses with bentgrass fairways mow with triplex putting green mowers. More realistic, however, is an inventory of three or four fiveplex mowers. Within this class of mower, many different models are available to suit the specific conditions at your golf course – type of turfgrass, topography, soil conditions, etc. Your course has just one or two fairway mowers? Strike two. What happens when one unit breaks down and there is no backup? Can your crew stay ahead of the golfers? Pencil out the cost of these inefficiencies and it will be apparent that the cost of an additional unit can be recovered in a short time.

***Roughs:*** Articulating rotary rough mowers with five to nine mower blades have significantly improved the mowing quality of turf in the roughs and streamlined maintenance efficiency. Smaller rotary and reel trim mowers allow mowing of areas that formerly could only be cut with walk-behind mowers or string trimmers. Significant scalping has all but disappeared at golf courses with an updated rough mowing fleet. Specific requirements depend largely on rough acreage and design, but generally one or two large rotary mowers and three to five trim mowers are needed. Don't forget that at least one machine will have to be set up to mow intermediate rough if this is a feature at the golf course. Advances in mower technology are, in fact, a huge reason that the roughs at many golf courses really aren't that rough anymore (17).

### Cultivation Equipment

Proper cultivation cannot be overstated. High maintenance standards, traffic, poor construction, bad soil conditions, overseeding, renovation, and/or basic agronomic sense underscore the need for a good cultivation program. And, since golfers generally abhor most of the practices mentioned in this section, it is extremely helpful to have the proper equipment so that cultivation work can be completed in a short amount of time with the least amount of disruption to play as is possible.

***Aerators:*** At least two walking putting green aerators are needed. Be sure that the machines have the necessary adapters to be equipped with tines of all sizes. The ability to perform specialized cultivation, including small-diameter solid-tine aeration, can make a big difference in plant health and overall success of greens. One or two tow-behind piston-driven aerators are necessary to aerate fairways and tees. No fairway aeration equipment in the fleet? Strike three. Next batter. Unless your course is located in a metropolitan area where contract aeration is available, the lack of fairway aeration equipment usually results in the development of agronomic problems and lousy playing quality. If rocks in the soil are a big problem, you may need to utilize a drum-type aerator in lieu of cam-driven units. The holes will not be as crisp or as deep, but at least gas exchange and water infiltration will be improved, soil compaction relieved somewhat, and an opportunity to overseed created.

Specialized aeration equipment, including deep-tine units and high-pressure water injectors, may also serve a useful niche, depending on soil conditions, water quality, and other factors. In many parts of the country, independent contractors perform this type of cultivation (14). Obviously, you will be limited by the schedule of the contractor. Timing problems and fickle weather conditions may warrant the purchase of such equipment. Seek the advice of a Green Section agronomist, university extension specialist, or other consultant to determine the best tool for the job and to justify the purchase.

***Core Harvester:*** A core harvester certainly pays for itself fairly rapidly. The crew also will be glad to take another step away from the Stone Age.

***Dethatching Machines:*** Once again, independent dethatching services have gained popularity in the turfgrass arena.

The development of new creeping bentgrass and bermudagrass cultivars for putting greens has prompted a refinement of management techniques, most importantly the control of organic matter deposition in the upper soil profile. If managing putting greens with the newer grasses, take a close look at available dethatching equipment.

***Topdressing Applicators:*** Sand topdressing can be one of the most important practices used to improve agronomic conditions and playability. Soil modification with sand can improve compaction resistance and drainage. Sand applications help control thatch and smooth and firm the playing surface. One tow-behind drop spreading applicator is needed to fill holes completely following core aeration of putting greens. For light and frequent topdressing, however, a tow-behind rotary applicator greatly facilitates this practice. Many of the best golf courses lightly topdress putting greens on seven- to 14-day intervals throughout the growing season. Tow-behind rotary applicators enable superintendents to complete light topdressing of 18 greens in about two hours or less, at rates light enough that brushing or dragging is not required and golfers do not notice the practice has been done. And, if you are not topdressing the approaches, we've likely just retired the next batter.

In some areas of the country, fairway topdressing is performed to improve drainage and footing and reduce compaction effects. Have you ever seen earthworms on golf course fairways? Research conducted at Washington State University has shown sand topdressing to be the most promising (and legal!) means of reducing earthworm casting problems in fairway turf. Obviously, a large-volume materials handler is needed to perform this task. But these also are useful for many other tasks around the golf course, including bunker and cart path work and compost and fertilizer applications.

***Rollers:*** Rolling putting greens, when conducted with moderation, can improve playing conditions without jeopardizing the health of the turf. Rolling can be used to save a mowing and provide a little more leaf area without losing noticeable green speed. Rollers also can help prepare a seedbed and smooth newly laid sod. Select a type that best suits the needs at your course. Labor availability and operator expertise should be considered.

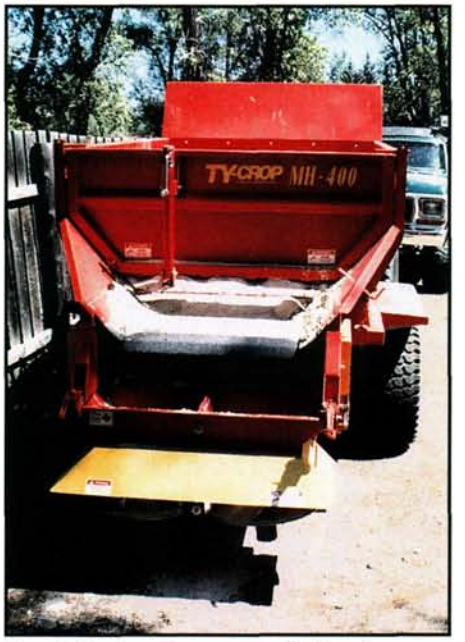
***Slice Seeders:*** A slice seeder is a must for golf courses that overseed annually. A slice seeder also is very useful when renovation is needed following winterkill, vandalism, pest damage, etc. Turfgrass species conversion can be enhanced with a good slice seeder.

***Spiker:*** A tow-behind spiker/tip seeder or spiking attachment for a triplex mower also is a useful component of the equipment fleet. Spiking is a good means of maintaining good gas exchange and improving water infiltration in the upper soil profile.

### Sprayers and Spreaders

Advancement in sprayer technology has enabled application equipment to keep pace with product innovation. Many of the available products currently labeled for turfgrass use contain amazingly low amounts of active ingredient, requiring precise calibration to accurately apply mere ounces of product per acre. These applications must also be made over varied terrain, in closed or tight locations, and on windy sites. Coupled with the associated costs of the various products, the need for accurate application control is critical. Computerized control systems match flow with ground speed and/or pressure to maintain a uniform application rate. A dependable, modern sprayer makes economic, agronomic, and environmental sense.

***Sprayers:*** A lightweight (approximately 150-gallon tank) sprayer with sophisticated control is a must for maintaining optimal putting green health and playing conditions. Foliar fertilization, plant growth regulator use, and accurate pest control applications are integral parts of many putting green management programs. A larger (300-gallon) sprayer for fairways and other large turf areas also should be included, along with two backpack sprayers and two hand-held sprayers for spot applications and edge applications.




*Specialized equipment, including large material handlers, can improve maintenance efficiency and make possible programs like fairway topdressing.*

***Spreaders:*** Four to six walk-behind rotary fertilizer spreaders are needed at any golf course. Two drop spreaders (one small and one large) will also serve a useful purpose. One large-volume fertilizer spreader is also a necessity.

### Utility Vehicles

Dependable transportation/work vehicles are needed to move employees around the course and complete tasks. On average, four to six heavy-duty vehicles and three to four light-duty vehicles should suffice. These numbers may need adjustments if the labor force is large.

### Tractors and Trucks

The inventory should include at least two utility tractors with PTO, one loader with backhoe, one dump truck, and at least one pickup truck.

### Miscellaneous Equipment

Most golf courses need one or two riding mechanical bunker rakes (even though hand raking is preferred). One or two sweepers, a tractor-mounted blower, a dump trailer, and a sod cutter should be on hand. Equipment including trenchers, chippers, stump grinders, and augers can usually be rented if use will be limited. An absolute must, however, are the proper grinding tools to grind both reels and bedknives and a hydraulic lift to service equipment (9). The shop also will require a steam cleaner, air compressors, a table saw, and a drill press.

### Small Equipment

Plan on the need for five to seven walk-behind rotary mowers, five to seven string trimmers, at least two backpack blowers, two edgers, two chain saws, a pole saw, shovels, rakes, picks, cup cutters, sod knives, pitchforks, and any other necessary hand tools.

### Protect the Investment

Based upon this list, the approximate inventory value based on initial purchase price could easily approach or exceed $1,000,000. Safeguarding this

equipment would seem to be common sense, but all too often golf course equipment is improperly stored and protected. Various components degrade rapidly when left exposed to the weather. Preventative maintenance commonly is not performed on a regular basis. Machinery hours should be tracked so that regular maintenance can be performed. Failing to protect the equipment fleet diminishes its useful life span substantially, resulting in significant additional expense to the operation.

The value of the equipment fleet and its importance to a high quality golf course underscore the need for a full-time equipment manager. Mowers should be inspected on a daily basis (13). Preventative maintenance schedules need to be developed and followed (1, 10). A well-designed maintenance facility, with plenty of storage space and the proper work area for the equipment manager and technicians, is the cornerstone of well-run golf course maintenance operations.

Finally, operators should be thoroughly trained on every piece of equipment to prevent unnecessary wear and abuse, and they should be able to recognize the first sign of a problem so that the equipment manager can service the machine in a timely manner (2, 5).

## Maintaining the Fleet: The Replacement Schedule

Maintaining an efficient, dependable, and current golf course equipment fleet requires a thorough and committed plan (7, 8). Without one, unwelcome surprises and a financial crisis are sure to arise (3). The golf course quality and competitive status may suffer for years as a result. Although there are no exact rules or formulas that can apply to all equipment or sites, there are some basic procedures and guidelines.

The golf course superintendent and equipment manager should review and update the status of each piece of equipment every year. This enables a prioritization of needed items during the budgeting process (3). Hours of operation and the total cost of repair, including parts and labor, should be tracked for every equipment item. Repair costs then can be compared to the replacement cost and current value of the equipment item to determine diminishing returns (15). Hours of operation missed due to breakdown, when the equipment item should have been on the golf course, should also be tracked to evaluate maintenance efficiency and any negative effects on playing quality.

Many golf courses that purchase their equipment allocate a figure for annual equipment replacement that represents approximately 10-15% of the total replacement value of the fleet. This is perhaps a useful beginning point, but fine tuning the budgeting process is only possible by tracking use and repairs as described above. Again, service, storage, and operation hugely impact the optimum replacement schedule.

While purchasing is usually the most cost-effective approach long-term, leasing is an attractive and effective method of managing equipment for many golf facilities (12). A shortage of capital is a compelling reason to consider a lease option. Clubs that have fallen significantly behind in equipment replacement may not be able to afford to catch up, but a lease could be an option that allows them to take advantage of modernization and dependability. Another advantage to leasing is the lack of turnover costs when items are due for replacement.

Any golf operation should work closely with an accountant to determine the best fit for equipment replacement (4). Tax advantages and disadvantages can be compared between purchasing, financing, and leasing. Golf course superintendents should provide details on the status of every equipment item and also present as many options as possible for replacement. When considering models from different manufacturers, be sure to include all cost factors, including the operational statistics, maintenance requirements, and any special benefits associated with each model (4). Available service should be considered strongly. You need to know that parts, answers, and/or backup items will be available when needed.

## Conclusion

The intent of this article has been to outline the requirements of a golf course equipment fleet necessary to meet the demands of most golfers. Obviously, this proposed inventory is but a framework, and individual requirements will depend upon regional differences, expectations, and special circumstances. The other important message is that this fleet needs proper care, protection, and regular replacement to maintain efficiency and quality, and keep up with technological advances (11). A primary limitation of many golf operations is a lack of the necessary tools to get the job done. Too much money is spent on repairs, and the corresponding downtime results in reduced playing quality. Deficiencies in the equipment fleet will limit the attraction of new golfers or members and compromise competitiveness in the market. How does your course rate following this checkup?

### Literature Cited


1. Barauskas, A. 1971. You can do something about the "whether." *USGA Green Section Record.* 9(2):35-41.

2. Bengeyfield, W. H. 1977. Great golf courses of America – their maintenance crews and equipment. *USGA Green Section Record.* 15(2):18-20.

3. Carson, C. 1999. Your budget is a sales tool! *USGA Green Section Record.* 37(2): 14-15.

4. Cleveland, C. 2001. Financial essentials for the superintendent. *GCSAA Continuing Education Seminar, Dallas, Texas.*

5. Eichner, R. H. 1981. Quality playing conditions and proper equipment. *USGA Green Section Record.* 19(2):16-17.

6. Gilhuly, L. W. 1987. Getting your house in order – an equipment list update. *USGA Green Section Record.* 25(5):8-10.

7. Gilhuly, L. W. 1988. Golf house management philosophy – it's a matter of quality. *USGA Green Section Record.* 26(4):1-6.

8. Gross, P. 1993. What do club managers need to know about golf course management? *USGA Green Section Record.* 31(5): 8-10.

9. Happ, K. 1996. Keep your edge. *USGA Green Section Record.* 34(6):8-9.

10. Happ, K. 1996. Preventative maintenance at a glance. *USGA Green Section Record.* 34(3):18.

11. Happ, K. 1996. Don't be shortsighted. *USGA Green Section Record.* 34(6):17.

12. Manuel, G. B. 1994. Equipment replacement: choosing a path of "leased" resistance. *USGA Green Section Record.* 32(2):1-5.

13. Moraghan, T. 1991. Greensmower maintenance. *USGA Green Section Record.* 29(3):9-11.

14. Vermeulen, P. 1998. Bringing in the hired guns. *USGA Green Section Record.* 36(2):10-12.

15. Watschke, G. A. 1987. Gee, I thought it ran forever. *USGA Green Section Record.* 25(4):7-9.

16. Zontek, S. 1989. Turf groomers: good for the grass, good for the game. *USGA Green Section Record.* 27(2):18.

17. Zontek, S. Smoothing out the roughs. *USGA Green Section Record.* 38(2):36.


---


MATT NELSON *is an agronomist in the Green Section's Northwest Region.*