



Cushman three-wheel Package-Kar during World War II.

# TURF VEHICLES



Cushman Truckster today with boom sprayer on rear. Photo courtesy: Broward County Schools.

**E**very minute counts today whether you are manufacturing automobiles or managing acres of recreational landscape. Time is money, as Henry Ford cleverly proved by speeding up his production lines more than 70 years ago. Seconds quickly add up to hours during a work week. By eliminating wasteful motion and letting machinery carry the load, you can increase productivity and do a better job.

People in the 1920s were amazed that Ford could pay auto workers five dollars per day AND build a car affordable to a larger percentage of the population. Ford realized that the success of his industry was based upon making his vehicles affordable to a maximum number of people. He had to have high volume to bring the cost of automobiles down. So he had to be able to create enough demand to assure high volume.

Ford's thinking is relevant today and can be applied to the golf and sports turf market

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Club Car's Carryall I and Carryall II.

### Turf Vehicles

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in this country. Industry studies have revealed that the number of golf courses in this country is not sufficient to meet the anticipated demand by golfers in the coming decade. The National Golf Foundation and the United States Golf Association have jointly predicted that more than 4,000 new golf courses must be built in the next ten years to begin to meet this demand. Without these new courses, the cost of golf will rise to a point that prohibits many potential golfers from playing.

The situation in Japan is a perfect example of what happens when the cost of golf goes unchecked. The price of membership at Japanese private courses is hundreds of thousands of dollars. The cost of a round of golf is several hundred dollars. Playing golf there is a privilege available to only a small portion of the population.

The situation is possibly more critical for U.S. colleges, universities, schools, and parks, which are faced with a tremendous demand for sports facilities. The rising costs of construction and maintenance are restricting the number of public and private recreational complexes. The problem is so severe that some colleges have been forced to limit the number of sports they provide for students. In some cities, Little League Baseball, soccer, and football clubs have been forced to shut down for lack of fields. Park districts are beginning to run out of space for fields.

Clearly the golf and sports turf industries must find ways of controlling construction and maintenance costs. In fact, they have been doing that for more than 20 years. Small, yet significant improvements are being made in the efficiency of labor. Advances in irrigation, mowing, aeration, fertilization and pest control have shaved hours off the payrolls of sports complexes. This has not only reduced the cost of construction and maintenance, it has helped

the industry adjust to a shortage of skilled labor.

Yet there will always be a certain amount of hand work that can't be eliminated if we are to continue to provide the level of play demanded by athletes. Machines can't replace labor when it comes to pin placement, setting tee markers, trimming, marking out-of-bounds, striping fields, preparing infields, repairing divots, placing bases and goals, and other important spot work. These jobs require a "human touch" and must be followed up by supervision.

Furthermore, the increased attention paid to our use of chemicals and higher expectations regarding the condition of sports turf require greater attention to detail and increased supervision. The turf manager and his staff must be able to cover acres of ground without wasting time. They can't do that on foot, and many sites simply aren't accessible by conventional vehicles.

The importance of time and motion in the sports turf industry can be compared to the aircraft industry during World War II. Thousands of aircraft had to be built as quickly as possible to supply the war effort in Europe and in the Pacific. Aircraft needing maintenance had to be repaired within hours instead of days. To make matters worse, there was a shortage of conventional ground vehicles to move mechanics and parts to aircraft spread across acres of tarmac.

The War Department desperately needed small vehicles to transport technicians and their gear quickly from hangers to planes. From this unusual set of circumstances arose the ancestor of the utility turf vehicle. Cushman, an engine manufacturer in Lincoln, NE, created the three-wheel motorized scooter before the war to increase the versatility of its line of two-wheel scooters. Instead of one wheel in front and two wheels in back, the company placed two wheels and a parts basket in front. The engine drove a single rear wheel.

After the War, the company sought a way to continue production of the scooter by adapting it to other uses. The growing popularity of the golf industry made the scooter a natural. To enable the scooter to handle the rolling terrain of golf courses as opposed to flat airports, Cushman engineers turned the frame around and powered the two rear wheels with the engine. The company added a bag carrier to the rear and entered the golf car business. It also engineered a version with a cargo box in the rear which became the forerunner to the utility turf vehicle.

During this decade, other companies responded to the popularity of golf cars. They included Club Car, E-Z Go and Harley Davidson. For the next 25 years, these companies would concentrate their efforts on golf cars, not utility turf vehicles. They utilized two-cycle engines because they were quieter and did not require a reverse gear, since a two-cycle engine can operate in both directions. Later, Club Car and E-Z Go would respond to the growing turf vehicle market.

"In the '60s, the turf vehicle market consisted only of three companies," recalls Don Smith, vice president of Smithco, "Cushman, Rogers, and Smithco. We designed our Red Rider with a fold-down ramp for easy loading and unloading of walk-behind greensmowers. Superintendents would occasionally put a small box on the back of an old golf car and use it like a turf vehicle. That was the market for nearly 20 years."

Superintendents continued to experiment with turf vehicles. "The first accessory was a sprayer," says Cushman's Clarke Staples, "They put a sprayer in back and attached the boom up front. They also wanted a dump box, so we installed a hand-pump jack and hinged the box to the frame."

As spreaders, topdressers, aerators and larger cargo beds were added, it became clear that a number of adjustments were necessary. Four wheels provided more stability than three. Frames, engines, suspensions, and transmissions had to be beefed up to carry and pull larger loads. Options such as power take-off, hydraulic assist, and quick connectors were incorporated to operate a greater assortment of accessories.



E-Z-Go GXT-800.



Now the operator had the use of a hydraulic dump bed, spikers, aerators, top-dressers, sprayers, spreaders, and even a power converter to provide alternating current for electrical hand tools. "It was clear that turf managers wanted to use the vehicles for as many purposes as possible," adds Staples.

In some cases, these accessories outweighed the importance of basic transportation. Specialized vehicles started to enter the market, including sand trap rakes, line markers, infield dirt groomers, sprayers, spreaders and sweepers. Companies such as Hahn, Toro, Jacobsen, Deere, Smithco, Ingram and Kromers began making dedicated versions of turf vehicles.

To maximize versatility, Cushman pioneered a three-pin quick connect system in 1973. This allowed some accessories to



The five-wheel Deere AMT 622.

be mounted directly to the frame instead of to the cargo bed. In fact, the cargo boxes could also be disconnected by pulling three pins, two for the hinge and one for the hydraulic lift.

This specialization, in addition to the growing demand for turf vehicles, reopened the market for manufacturers of smaller, less versatile products. "There are three parts of the market today," reports Michael Alexander with Club Car. "There is the high-end, multi-use truck-type vehicle. These are heavy-duty and offer the greatest number of features. The low end is designed for economy—basic reliable transportation at a low cost. Then there is a growing middle range of vehicles. These provide some of the most popular features at a moderate price. I believe every manufacturer would agree that the need for low- and mid-range turf vehicles is on the rise."

Each feature has its price. While water-cooled, four-cycle engines are quieter and more durable under constant, heavy use, they add to the price of a vehicle. A two-cycle engine is an economical option for vehicles that carry smaller loads, explains E-Z Go's Ron Skenes.

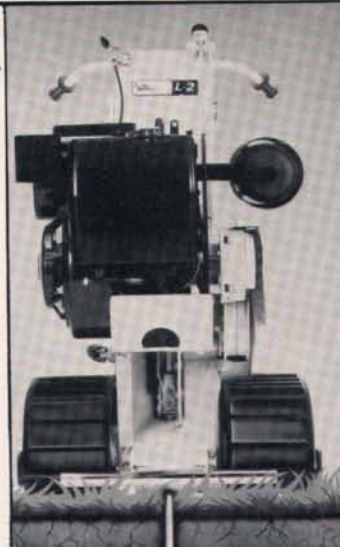
The same is true for continuously-variable transmissions. They eliminate shifting and increase operator control. That's fine for most loads. However, if the vehicle regularly carries heavy loads up steep inclines, there is an advantage to being able to downshift into a low gear.

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## Turf Vehicles

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Club Car and E-Z Go offer vehicles for all three ranges. Club Car has offered a cargo box option to its line of golf vehicles for 15 years. Four years ago it introduced the Carryall II as a multi-purpose, high-range turf vehicle. Last year it added the Carryall I for an economical alternative. All its vehicles come with an aluminum frame and cargo bed to reduce weight and prevent corrosion.

E-Z Go serves the high-end with its GXT-1500 and lower ranges with its GXT-300 and GXT-800. The 1500 has a four-cycle gas engine with a five-speed synchromesh transmission. It can carry a payload up to 1,500 pounds in its diamond-plated, corrosion-resistant large cargo bed. The 300 and 800 carry a payload up to 1,000 pounds powered by a two-cycle engine.

Cushman's strength is in the heavy-duty vehicle. Starting with its Runabout and progressing to its three- and four-wheel truckster, the company includes a four-cycle engine and three-speed synchromesh transmission in these models. The turf manager has an option of a 22 hp air-cooled engine or a 27 hp liquid cooled powerhouse. All three vehicles boast a 1,600-pound payload. Cushman also originated the use of most accessories available today for turf vehicles.

The company reinforced its position in



Kawasaki Mule 1000.

the medium-duty category with the Eagle two years ago. This four-wheel multi-purpose vehicle has rack and pinion steering for a tighter turning radius. It is powered by a smaller (12.5 hp) air-cooled engine and can carry a 1,200-pound payload.

Smithco has expanded its line of turf vehicles from the original "Little Red" to the huskier four-wheel drive Bandit and the two-wheel drive Runaway. The Red Rider was introduced in 1967 with an 8 hp air-cooled engine and 1,000 pound payload. The Bandit and Runaway can carry up to a 1,500-pound payload with their 23 hp twin-cylinder Kohlers. The Runaway is the model that offers a sprayer, spreader and hydraulic-dump box as options.

Deere entered the golf vehicle market with a two-range approach. The 1500 is

designed to compete with other heavy-duty haulers carrying 1,500 pounds of payload. Powered by a 16-hp air-cooled engine and a three-speed synchronized transmission, the four-wheel vehicle looks more like conventional turf vehicles than its cousin the AMT 600-622. The five-wheel AMT uses four of its wheels to push itself over nearly any terrain. The variable-speed transmission and 8.5 hp or 10 hp air-cooled engine take the driver and up to 600 pounds of supplies just about anywhere.

Toro has focused its attention on the middle range with its Workmaster. The three-wheel vehicle carries a payload of 1,000 pounds powered by a 14 hp air-cooled engine and hydrostatic variable-speed transmission.

Other contenders to the moderate-duty turf vehicle market are Kawasaki and Yamaha. Yamaha recently introduced its Pro-Hauler while Kawasaki has made a few waves during the past two years with its four-wheel Mule 1000. Yamaha has experience in both the golf car industry and the ATV (all terrain vehicle) markets. Kawasaki, like Yamaha, has produced ATVs for a number of years and utilized some of this technology for the Mule.

Three other companies are crossing over from another market into the turf vehicle market. Daihatsu, Mitsubishi, and Chikusui have been manufacturing "mini-trucks" for industrial use for years. Their success in

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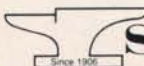
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engineering versatility into a small truck chassis is now being applied to the golf and sports turf industries.

The Daihatsu Hi-Jet is the veteran vehicle in this category. Powered by a three-cylinder, water-cooled engine, the Hi-Jet can be adapted to carry either 1,750 pounds or six people. Truck-like equipment such as a cab, rack and pinion steering, MacPherson strut suspension, four-wheel drive, and hydraulic dump, have secured a strong position for the vehicle in various industries. In fact, it is common at airports, the birthplace of the original turf vehicle.

Mitsubishi's Mighty Mit and Chikusui's GX-20 are built along the same lines. They have higher maximum speeds than more conventional turf vehicles and a tighter turning radius. It is therefore important to restrict their speed on golf courses or sports complexes. As yet, these vehicles do not offer many of the standard turf accessories, but have other accessories which make them versatile.

Utility turf vehicles are no longer a luxury for a pampered turf manager. They save a considerable amount of time on the job, if only during travel from one location to another. At walking speed, let's say three miles per hour in this case, it can take a superintendent or crew member more than an hour to traverse each yard of a regulation-length course without stopping. At the same speed, it takes a sports turf



**The Hahn 435.**

manager more than a minute to walk from one end of a football, soccer or baseball field to the other.

Minutes add up quickly during numerous trips. A turf vehicle takes just a fourth of this time at 12 mph. By carrying important equipment and supplies, the vehicle can also eliminate many unnecessary trips. They place hoses, irrigation parts, small mowers, spreaders, fertilizers and pesticides within constant reach.

That benefit alone is enough to justify the expense of a turf vehicle. Add to this the tremendous ability to keep a closer watch on your crew. Things get done right the first time. You can be anywhere on your facility in seconds with needed advice or direction.

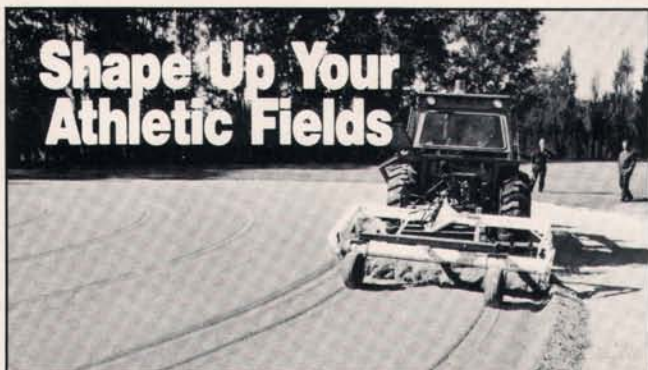
A turf vehicle and a radio can save hours of wasted time.

If that weren't enough, manufacturers have given these vehicles the ability to perform a variety of tasks besides transportation. In some instances, this saves the cost of buying a separate piece of equipment.

Unlike Ford's production line, you can't turn a knob to increase the pace at which your staff works. But you can still save hours of wasted motion by using the turf vehicle and other efficient turf management techniques as management tools.

In this way, you will help keep the cost of sports turf maintenance and construction down... and make sports and recreation available to a larger percentage of the population. ●

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