

# Japan's Saitama Stadium: Maximizing the land

BY CLINT MATTOX

When I wrote a former teacher that I was working on golf courses in Japan and had begun to work on new soccer stadiums for the 2002 World Cup, she questioned, "They have enough room to build golf courses and football stadiums?" She knew that land is precious here and must be used effectively, especially for these monster stadiums.

Saitama Stadium, located just north of metropolitan Tokyo, is a prime example. The area is accessible to many people and the stadium is a designated emergency evacuation site during natural disasters. With a solar power generation facility and a rainwater utilization design, this stadium is unique beyond being the largest soccer-only facility in Asia.

When it opens next June, fans will see the wonder that is Saitama, the new heart of Japanese soccer, with its two practice fields and special train line. For many reasons, we had to make this field special.

I worked for Kajima Construction Co., which has played a large role in designing, constructing, and maintaining many of the Japanese, and Korean World Cup stadiums and pitches. Kajima designs and constructs stadiums, bridges, and skyscrapers and its ecological division manages golf courses and some of the World Cup soccer pitches.

Kajima realized that Saitama Stadium made for some great opportunities but also some new hurdles for turfgrass management. The field has no running track, which allows the seats to edge up very near the field. This makes for tremendous views for fans, but Kajima was concerned about shade on the field being an obstacle.

## Golf lessons

Because the roof hugs the field and shelters it from the sun, shade made for big disparities in on-field temperature, which in winter meant freezing, an unacceptable condition for a busy field so near to Tokyo. So Kajima installed a temperature control system similar to one that they had previously installed in a golf course green.

This system consists of 25 miles of piping and is designed to maintain the field at the ideal temperature year round (see Figure 1). After analyzing the testing facilities results, the optimum field temperature was determined to be 68 to 77 degrees Fahrenheit at 6 in. from the crown layer. Test results showed that the root system in the 2 to 6 in. range is the area of the most active nutrient uptake, so the system was placed at the 10-in. level in order to be a safe depth from machinery damage but close enough to have control of the root zone temperature.

Because it is necessary to both cool and heat the field, the system uses temperature-regulated water instead of an electric system. To resist pipe bursting, a seamless pipe design was incorporated; pure water was used instead of a heating/cooling liquid in case of a rupture that could potentially pollute the soil profile. The system circulates water at approximately 1,055 gpm throughout the field.

Using the results of a light intensity simulation test, Kajima divided the field into seven segments and computer controlled temperature gauges and moisture reading equipment was installed to counterbalance the temperature difference phenomenon.

Due to the earth's rotation, two sub-sections had to be separated for different shading effects in the winter season. Depending on the weather, the system is not necessary during the mild temperature months of April, May, and October.

The 40-day installation of the soil temperature control system began in the middle of January 2001. A 4-in. gravel layer was deposited after the drainage tile system at approximately 26 ft. spacing was installed. Construction plans called for a 12-in. sand and soil amendment profile, but because tests showed the temperature control system was most effective at 10 in. from the crown layer, the lower 2 in. of sand was applied initially. Then came the web of seamless heating and cooling pipes of 20-mm diameter with a separation of 12-in. centers.

Once the temperature control system was in place a pressure and liquid omission test showed no risk of leaks or bursting, so the remaining 10 in. of soil profile was added.

## Working the schedule

The players' stage required an all-natural lawn pitch (see Fig. 2), consisting of Mic-18 Tall Fescue, Cutter Perennial ryegrass, and a Kentucky bluegrass combination of the cultivars: America, New Grade, and Indigo. According to Mr. Takeuchi of Kajima, "The whole vitality of the pitch is increased with the power of the selection between the turf cultivars".

The temperature control system was used to ensure that the ideal integrated temperature would ensure successful germination by the multiple turfgrass varieties. A seeding date of March 26 allowed for the first mowing on April 21.

Kajima also used a compaction resistant fiber in the most trafficked areas, center field and the goal zones, because testing determined that the fibers made a noticeable increase in turf stability by increasing the bearing capacity of the treated areas, therefore aiding in compaction reduction and damage resistance.

The many different elements of Saitama Stadium came together to make the most of a wonderful opportunity (see Fig. 3). The simple task of providing a playing field for a soccer game has resulted in a soccer complex to promote a region, an emergency evacuation site to protect a country, and an experimental site to promote better soccer playing conditions for the future of not only Japan, but for the world of soccer.

I returned home with a great appreciation for the Japanese culture and especially their ability to consider every possible use for land, their most valuable commodity.

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Clint Mattox, student at Purdue University, worked in Japan for his co-op experience.



Top: Figure 3  
Bottom left: Figure 1  
Bottom right: Figure 2





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of which combines to dig a big hole while the operator looks like he's comfortable enough to have a sandwich. You can position the wheel index at a 30-degree angle too, to get at those troublesome roots.

The operator showed me how easy it is to attach tools to the Dingo; even I can turn two locking pins and connect two hydraulic lines. Key also is that you can fit the Dingo in places where traditional grinders can't go—that's saving money and time.—Eric Schroder

The Toro Company/  
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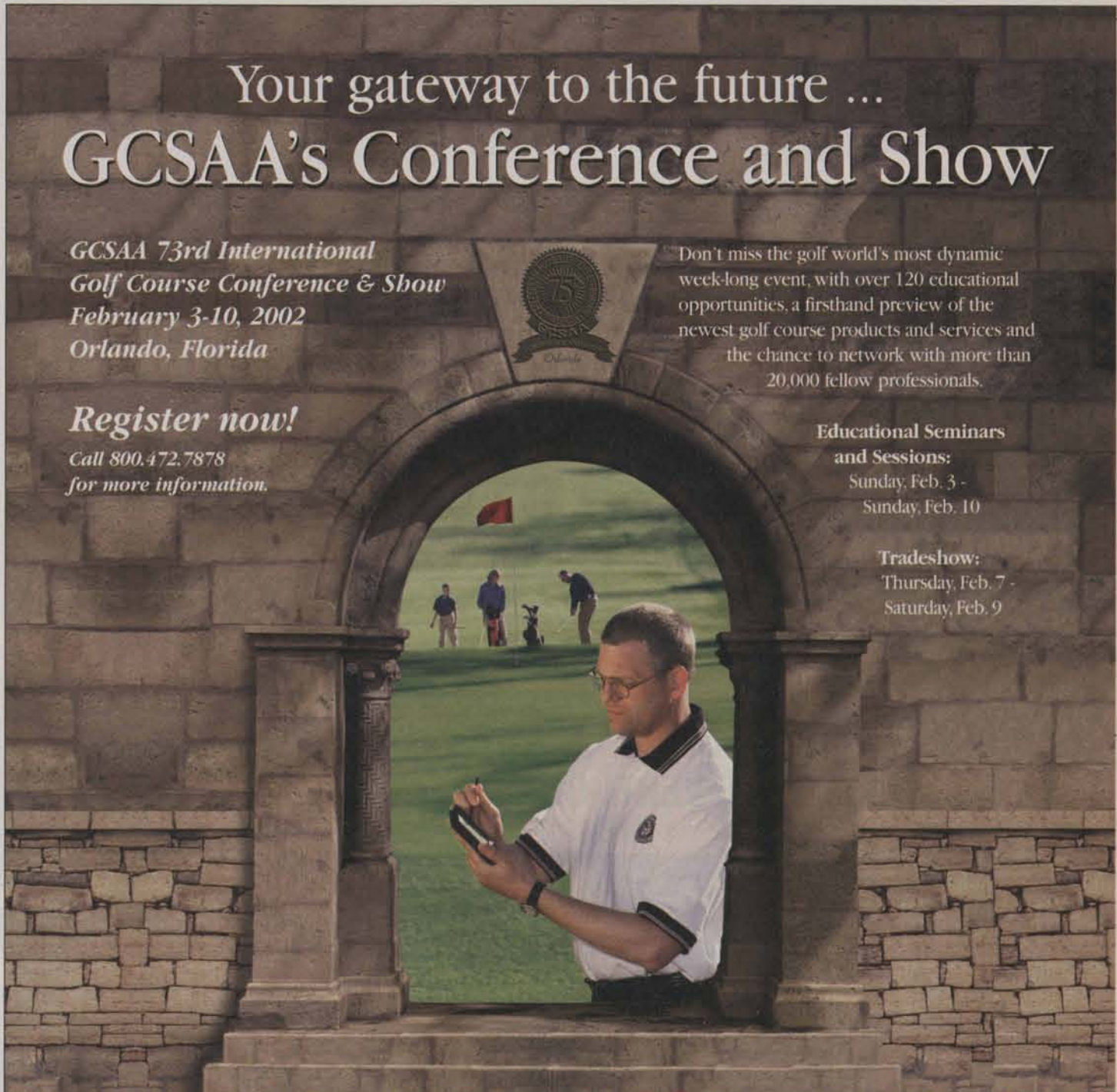
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### ROUGH CUTTER

Hustler® Turf Equipment has introduced its Hog™, a mower deck for those areas you only need to maintain a few times a year. It features a 48-in. single blade deck that cuts anything it can bend over, says Hustler.

The zero-discharge deck has 1/2-in. x 1-in. bar stock all the way around and reinforced side walls; the 5/16-in. blade has swinging blade tips for safety and a hazard-jumper™ center section. Tires are foam-filled to prevent flats.

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### MINI-EXCAVATOR

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Designed for work in confined areas, the product has an overall width of 39.4 in. The long track length, with 44.5 in. between the idler sprocket centers, helps decrease ground pressure and increase stability.

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### TRACK TRENCHER

A Cat C-12 powers the Vermeer T1055 Commander track trencher with terrain leveler attachment that works in many applications. This machine features a hydrostatically controlled cutting drum, counter rotating hydrostatic tracks, an ergonomic operator's station, TEC 2000.2 electronic system, and notable warranty program.

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### PULL-BEHIND TRIMMER

The Swisher Postmaster is designed to pull behind an ATV or tractor and trim around fence posts. Hand-held trimmers become heavy over time and the operator will eventually become fatigued, which is eliminated with this product.

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### SALT & SAND SPREADER

Now available for your winter needs: a 6 1/2-ft. hopper salt and sand spreader, which will fit full-sized extended cab short-box pickup trucks. The model 610 has a 1.45 cu. yd. capacity and adjustable deflectors and internal baffles that can customize spread patterns from 4 to 25 ft. wide.

Available optional equipment includes hopper screens, truck tie-downs, 12-in. side extensions, and spinner extensions.

Hiniker Co./507-625-6621

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# Sports Turf Topic: Winter dormancy

What does dormancy really mean? We know that the plant is still active. Even if the leaves are not growing or have lost their green color, many cycles are still active and growth can still be taking place.

With cool-season turf, such as bluegrasses and ryegrasses, foliar growth slows with decreasing temperatures. When the air temperature is below the mid 50's, top growth basically does not occur. Root growth will also slow with decreasing soil temperature, but growth still occurs as long as the soil is not frozen and there is adequate soil moisture.

Fall fertility has been practiced by sports turf managers since the early 70's. The use of high nitrogen fertilizer increases stored carbohydrates and with the reduction of top growth, root growth increases dramatically. At this time of year, any

practice that increases roots also increases the turf's potential to survive next year's stresses.

Fall is an ideal time to use biostimulants. Focus® and Launch® contain plant hormones such as cytokinins which increase the plant's potential to develop roots. The use of biostimulants in conjunction with fall and dormant fertility programs allows the turf to increase its root system. These same hormones have also been shown to increase potential for photosynthesis. The amount of light that is absorbed by the plant and used to produce carbohydrates increases with applications of hormones derived from sea kelp extracts.

Fall applications of biostimulants will accent the plants natural ability to store carbohydrates and develop the root mass that the turf will need during next year's play.

### Condition your turf with Launch® and Focus® Turf Biostimulants. For tough turf that won't buckle under. Even after the game.

*"Due to stadium construction, portions of our field had to be sodded only a week before the opening game. I applied Launch® and the sod was knit down and playable by game time. The massive root development I get using Launch year-round helps my bluegrass field survive our temperature extremes here in Kansas City."*



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