



Joe Robbie Stadium's PAT field is wide enough for international soccer competition.



The completed field two weeks prior to its inaugural exhibition game in August.

Robbie's Law: Be a Stadium Not a Team

Some of the greatest plays in professional football are made off the field by people who never wear pads, helmets or cleats. The people making these plays are quarterbacks in their own right, but they will never be inducted into the Football Hall of Fame. They have contributed as much to the game as the greatest players who ever graced the gridiron but you'll never see them on Monday Night Football. Joe Robbie is one of these individuals.

Robbie owns the Miami Dolphins, a team he helped create in 1965 during the last major expansion of the National Football League. He knew then the importance of a stadium to the success of a NFL franchise

and has never forgotten it. Miami's Orange Bowl helped tip the scales in his favor so he could build one of the most successful franchises in NFL history.

Every fall for 20 years, Floridians flocked to the historic 75,000-seat stadium to see the Dolphins play. Loyal fans tolerated parking on city streets, college-style seating and long lines at concession stands and restrooms. The city did what it could to satisfy the team and its season ticket holders. In 1976, it installed the first prescription athletic turf (PAT) field in the NFL. Seating was upgraded as public funds were made available.

To pay for some of these improvements

the city added events. The use of the stadium grew as the Dolphins, the University of Miami, the Orange Bowl Classic and local high schools and colleges played on a tight schedule that included concerts, motocross, soccer and tractor pulls. Robbie and Dolphin Coach Don Shula became concerned over the impact of these other events on the condition of the field and the stadium. Professional football was becoming more businesslike. Attracting corporate sponsors, season ticket holders and the best players and coaches were based largely upon the reliability and revenue-producing ability of the stadium. So, in the late '70s, Robbie started voicing his concerns to the city and



Joe Robbie Stadium (right) is located across the Snake Canal from Calder Race Course.

Stadium Owner, Ant



Guy Kuykendahl paints the field for its professional debut in August.

considering his options regarding a stadium for his Dolphins.

Football was Robbie's life, but his training was in law. Rather than making snap judgements, instead he looked for small loopholes that others had failed to notice. He had developed unique contracts with his coach and some of his players to attract the best talent for his team. The answer he was looking for was not public financing or another publicly-owned and operated stadium. Why couldn't he devise a unique arrangement to build one of the only privately financed stadiums in the League?

In 1984, Robbie's research led him to HOK Sports Facilities Group, a Kansas City, MO,

architecture firm specializing in stadiums. With some creative planning, Robbie believed a stadium could pay for itself and asked HOK's Ron Labinski and Dennis Wellner for their suggestions. Having previously developed solutions for Giants Stadium, The Pontiac Silverdome, Arrowhead Stadium, Milwaukee County Stadium, Candlestick Park and the Hoosier Dome, HOK was anxious to perfect the income generating potential of skyboxes and an improved type of seating for season-ticket holders called "club seating." Both types of seating could be sold to corporate and individual sponsors ahead of time to generate the level of credit worthiness lenders require before making multi-

million dollar loans.

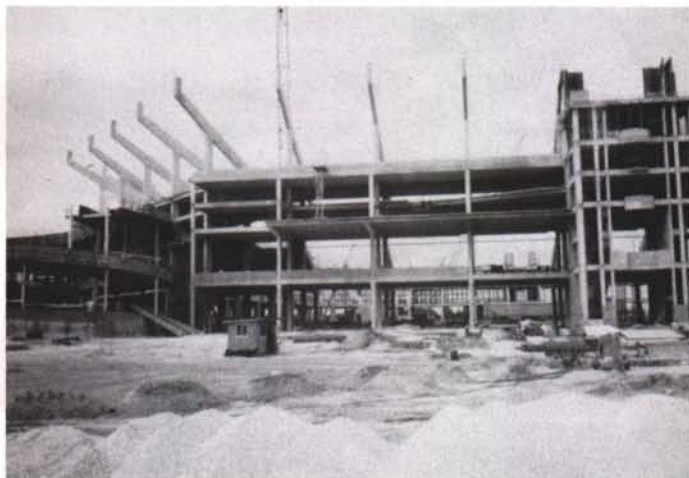
Skyboxes, luxury suites designed for corporate entertainment during games, had generated important revenue for other football and baseball franchises. In addition to the \$30,000 to \$65,000 annual lease for a skybox, a corporation bought a set number of tickets to each event held in the stadium.

Club seating was designed for individuals or small companies that wanted some of the same conveniences of skyboxes without the sky-high price. For \$600 to \$1,400 per year, fans in club seating could view the game in a comfortable, premium-

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More than 8,000 yards of sand were graded to a four-inch crown.



By the end of 1986, the stadium was starting to take shape.



Sand is carefully placed on top of the drain lines.

Robbie's Law

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view seat and take advantage of conveniently located lounges reserved just for them. These fans also purchase tickets for events just as skybox customers do. Labinski had helped develop the club seating concept for the Edmonton Eskimos of the Canadian Football League in 1977.

The Dolphins had become an important part of the Miami entertainment scene without really providing local corporations with much more than a seat. Robbie believed that there was an opportunity to utilize this virtually untapped commercial support to build a new stadium. HOK proceeded

with a stadium design that included 216 skyboxes and 10,000 club seats, far more than had ever been built in stadiums before.

With a 20 year record of winning teams, Robbie felt he had the solution to financing in his grasp. He convinced Dade County that tax revenues generated by a stadium in the northern part of the county would easily make up for a one dollar per year lease on 460 undeveloped acres. He then developed an extensive marketing program to obtain ten-year leases on skyboxes and club seats. Before the first shovel of earth was turned, Robbie had \$20 million in lease and ticket commitments, enough to convince three banks to lend him the \$100 million

he needed to build the stadium.

He found the loophole he was looking for and revolutionized stadium financing in the process. He raised the eyebrows of owners of professional sports franchises across the U.S. and has helped fuel the hopes of investors looking for expansion teams for their city. In the long run, Robbie may have lifted a great burden off the taxpayer in cities with municipally-owned stadiums and discovered the way to "privatize" the stadium business.

He also may have removed a roadblock to major field improvement at stadiums across the country. Robbie has been a fan of natural turf since 1976 when he was in-

strumental in having the artificial turf in the Orange Bowl replaced with the PAT system. Natural turf meant the stadium needed a natural turf manager. Miami hired Dale Sandin, a golf course superintendent from Georgia, who got to know Robbie well over the next ten years.

"Mr. Robbie always took an active interest in the field," recalls Sandin. "When we had field problems he would first ask me what was wrong before he made any statements to the press. He always supported me when people took pot shots. He understands how the PAT system works and what can go wrong."

"Joe Robbie wanted natural turf from day one," reveals HOK's Wellner. "He was very realistic about the limitations of a natural field, but he insisted on it anyway. He supported the NFL regulation requiring all natural fields to have tarps available in case of rain. When the PAT people asked if a tarp storage area could be built underneath the stands along one side of the field, he approved the change order without hesitation."

The stadium site, which is located on the Snake Canal in Davie, FL, across from Calder Race Course, presented additional challenges for HOK, the general contractor Huber Hunt and Nichols, and Southern Turf Nurseries, the field installation contractor. At its original elevation, the water table was just a foot under the surface. Soil and compaction tests showed the existing sandy soil



Both irrigation lines and the network of perforated pipe were placed on top of the plastic barrier.

and inconsistent rock formations below the surface would not settle evenly under the weight of a stadium and 73,000 football fans.

Many stadiums are built partially below ground with the field below the outside elevation. Designers like to have spectators enter stadiums on a concourse above the first level of seating. This simplifies access for all fans. Due to the shallow water table beneath Joe Robbie Stadium, a different approach was needed.

Since all fans would have to go up to reach their seats and down to exit the stadium,

HOK devised a set of eight circular ramps with escalators—two for each corner of the facility. A capacity crowd can leave the stadium in about 15 minutes.

To compress the rock and sand before the first cement was poured, 500 cubic yards of fill was piled on the stadium's footprint. The 40 foot high mountain was left untouched for nearly four months before it was spread over the site. When the dozers finished, the stadium floor was ten feet above the former ground level.

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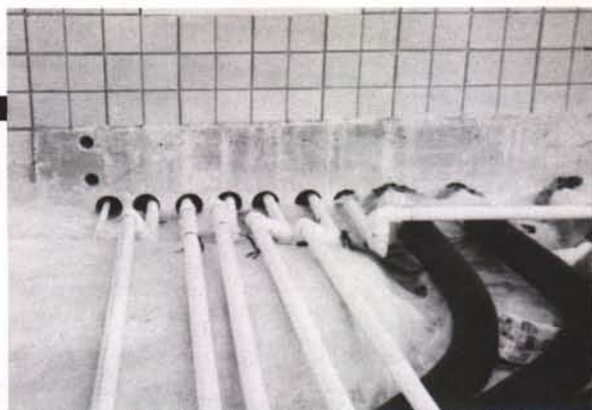
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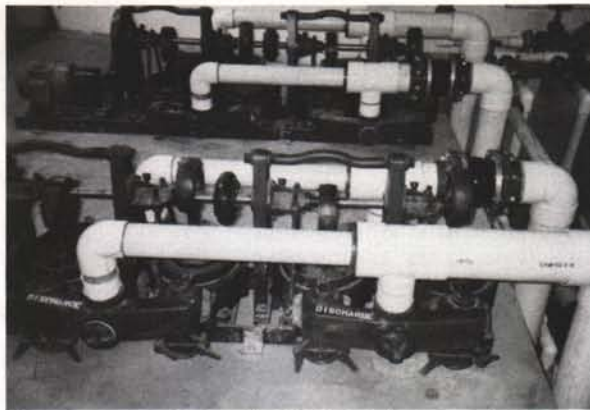
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Irrigation and drainage lines lead into a central control room.



Two pumps provide suction for the drainage system.

Robbie's Law

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While not all of Robbie's experiences with PAT were pleasant, he believed he understood why because of his frequent discussions with Sandin. Cancellations are a definite threat in Miami where tropical storms are common and it rains nearly 60 inches every year. One cancellation can take more than \$200,000 off the bottom line. Robbie had seen the pumps at the Orange Bowl suck standing water off the field in a matter of minutes. Despite a tight budget, he set aside the \$600,000 for a PAT field.

As footers were poured and girders started to form the pattern of a stadium, PAT's Dr. William Daniel and Laurel Meade started

making final adjustments in the plan with Dr. Tim Bowyer, Turner Gibson and Bill Wilson of Southern Turf Nurseries. The plans and prices for the stadium field were first submitted in the summer of 1985. It was now August 1986 and construction of the field was to start in February, 1987. Robbie takes special interest in the plans for the irrigation system and asks Wellner to check on other PAT fields with surface irrigation systems. He is concerned about heads located on the field. To satisfy Robbie's concern, the number of heads on the playing surface was reduced to 12, four of those in the end zone.

More than three acres of Tifway bermudagrass sod was being custom-grown

on sandy soil at STN's sod farm in Lake Wales, FL. "We had soil samples from the farm tested," explained Wilson. "The lab said they were the closest thing to a greens mix they had ever seen." More than 8,000 yards of sand with a specific particle size were ordered in addition to three miles of drainage pipe, three acres of plastic liner, and 60,000 pounds of calcined clay. Orders for the irrigation supplies and two vacuum pumps were also placed months in advance.

On February 9, 1987, the STN crews began laser grading the flat subgrade. No slope is required for the PAT system to operate. The plastic moisture barrier was installed over the subgrade and up to the stands sur-

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rounding the field. The network of wrapped perforated drain pipe was then put together on top of the liner. The distance between drain lines is closest in the center third of the field, the part of the field receiving the most wear. In this part of the field the lines are only eight feet apart. This enables the drainage system to remove up to four inches of rain per hour from the center of the field.

The drain lines feed into "wet pits" located behind the goal posts at each end of the field. The subirrigation system works by injecting water into the drain lines at the wet pits. By removing water from the wet pits

and adding suction, excess moisture is drawn out of the root zone quickly. This dual-purpose drainage system is really the heart of the PAT system. The sand root zone only improves its performance.

With the drainage network in place, STN started putting together the surface irrigation system. It consists of 44 Toro 640 heads, 64 feet apart, in a square pattern. The heads are divided into six zones. The playing surface is divided into two zones splitting the field down the center.

The ability to irrigate the playing surface and not the perimeter was important, but Daniel also wanted to be able to operate all zones at the same time. This required

a larger six-inch main line and another change order which was quickly granted by Robbie. "We got everything we asked for," exclaimed Wilson. "The Dolphins' cooperation made this project the smoothest installation we've ever had."

With the drainage and irrigation systems in place, 8,000 yards (13 inches) of sand were spread over the field. After mixing the calcined clay into the top three inches of sand, a four inch crown running from the center of the field to the sidelines was graded. "The only purpose of the crown is to make water flow off the tarp during a rain," explains Daniel. "The NFL requires a tarp to cover the playing surface in case of rain. The areas outside of the playing surface are perfectly flat."

By May 1, all 128,000 square feet of Tifway sod was down and rolled. The sod was laid in sections to fit the irrigation zones. "Soil and air temperatures were perfect," recalls Wilson. Within days the sod was rooted into the sand/calcined clay mix. "If anything, it grew too well. We started to build up a thatch layer faster than we would have liked. We had to maintain the field ourselves until Dean Kuykendahl was hired in July."



Suction can be directed to certain parts of the field with these valves.

Kuykendahl was not very familiar with warm season grasses when he left Lewis University in Romeoville, IL, to take the job at Robbie Stadium. He had worked brief stints with Harry Gill at Milwaukee County Stadium and Steve Wightman at Denver's Mile High Stadium. "I had a lot to learn right off the bat," said Kuykendahl. "The first exhibition game was just a few weeks after I started. I had to correct the thatch and mowing problems before then. On top of that, I had to learn how the PAT system worked."

With help from Wilson and Daniel, Kuykendahl got approval from Joe Fletcher, director of stadium operations, to get verticut reels for his Deere triplex and a top-dresser for sand. He also removed the front rollers from the reels so he could achieve

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7. Number of events on baseball diamond per year.
8. Types and number of events on diamond other than baseball?
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a better appearance on the thick bermudagrass. After two weeks of 20-hour work days, Kuykendahl had the field ready for its debut. "It was tough at first, especially when I realized how much Joe Robbie had put into the success of the stadium," says Kuykendahl. "I kept in constant touch with Dr. Daniel, Laurel Meade, Harry Gill, Steve Wightman, Turner Gibson and Bill Wilson. They helped me through the initial problems so I could concentrate on the PAT system."

The primary aspect of the PAT system Kuykendahl had to learn was the portion that senses and controls the amount of moisture in the root zone. Ten pairs of moisture sensing probes are imbedded in the sand field. Each pair of probes is located approximately 20 feet away from the second sprinkler of each irrigation zone. The two probes are placed 20 inches apart from each other. Probes are placed in the top two inches of the root zone and four inches below the surface. Using feedback from the probes Kuykendahl knows the surface and subsurface moisture levels in various locations around the field.

If the probes indicate the desired level of moisture has been reached it will halt further irrigation. A time clock also restricts surface irrigation to early morning. When Kuykendahl fertilizes he has to override the moisture control system to water the nutrients into the soil. "It sounds complicated, but it works great once you understand it,"



After calcined clay was mixed into the top three inches of sand, the field was irrigated to bring moisture levels up to specifications.

he says.

Daniel provided Kuykendahl with a year-round schedule for the PAT system. During the winter (November through April) all gravity drains are open and moisture is applied as needed by the surface irrigation system. During the summer, however, the gravity drains are closed and both surface

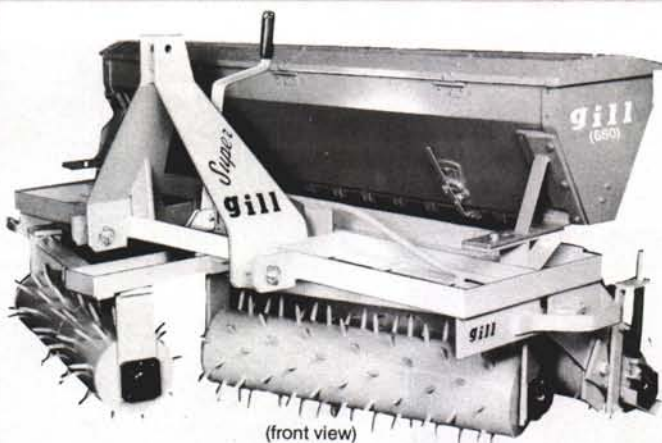
and subsurface irrigation are used. The drains are opened only in case of excessive rainfall.

In the case of heavy rain, the gravity drains are closed and the valves to the two pumps are opened. To override the moisture control system the control is set higher than

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More than two acres of Tifway sod was installed in May. Note the tarp storage area beneath the stands.

Robbie's Law

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current soil moisture levels. All or part of the suction can be directed at three different field zones. During a game the pumps can be used to pull excess rainfall off the center third of the field if necessary. "You can see the water get sucked down into the ground when the suction system is on," says Kuykendahl with amazement. "After one downpour we had standing water on the field. In less than 30 minutes the field was dry enough to play on without ripping up turf."

From late spring to the beginning of the football season in August the field moisture level is set between 30 and 50 percent. It is increased to 60 percent during the season. The field is covered with the tarp if it rains on a game day. Water running off the tarp to the sides of the field is picked up by the suction system. Once the tarp is removed for the game, the field can withstand rain up to four inches per hour without affecting the game.

The field is aerated and topdressed with sand as needed to maintain specified infiltration and percolation rates. A program of monthly light verticutting is augmented

once a year with heavy verticutting.

Nutrient levels in both the turf and the root zone are checked frequently. Daniel has asked Kuykendahl to keep soil test results in the medium to high ranges at all times and tissue analysis results above 3 percent nitrogen, 0.5 percent phosphorus, 2.5 percent potassium and 300 parts per million of iron. Kuykendahl uses granular fertilizers (24-4-12) containing at least 50 percent slow release nitrogen as the primary source of nutrition. He keeps records of all fertilizer and pesticide applications.

One hidden benefit of the PAT system is prevention of salt water intrusion from below the field. The final grade of the field is normally seven feet above the water level in Snake Canal. Saltwater does enter the channel during severe storms. The sealed bottom of the PAT system would stop any salty overflow from the channel from reaching the field soil.

While the stadium was built for the Dolphins, it is also the only full-size, natural field for international soccer in the country. HOK also took professional baseball into consideration. By removing one semi-permanent section of seats, a baseball layout is revealed. HOK went so far as to include an extra locker room beneath the stands for a future baseball team.

"Joe Robbie Stadium combines nearly every advantage a stadium can have today at a reasonable price," says HOK's Wellner. "As more stadiums are built with private financing, value and flexibility are essential. While the advantages of single-use stadiums are clear, we have to be realistic about the importance of other events." This fall the stadium will host two shows in addition to the Dolphins ten home games. No one would state if Dade County placed restrictions on the development and use of Robbie Stadium and the 460 acres it occupies.

The success of the stadium is best illustrated by season ticket sales and skybox and club seat leases. Wellner's greatest concern was over the amount of club seats. "We just didn't know how many to include. We decided to go with 10,000 club seats and I'm happy to say more than 8,000 of these were taken by the first exhibition game." Furthermore, 146 of the 210 skyboxes are also taken. On top of that, the Dolphins have sold 53,000 season tickets for regular seats. That means less than 10,000 out of 73,000 seats are available for game day sale.

"Everybody wanted to see Joe Robbie succeed," points out STN's Bill Wilson. "Suppliers never dragged their feet or got sloppy with deadlines. Everybody was amazed with how smoothly things went. The stadium people made all the changes we asked for without a fight. It was a great experience."

"Part of our agreement with the stadium is a two-year follow-up program to make sure the field and the turf reach maturity without a hitch," explains PAT's Daniel. "So far, it looks like some of Joe Robbie's success has rubbed off on all of us. I think he has set a standard for other stadiums to follow in the future." ☺

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