ASK THE "EXPERT" Julius Albaugh, CGCS, and Frank Heery Westmoreland Country Club

Aggressive Green Aerification: A Case Study

In order to understand the thought process associated with our greens aerification program, it is necessary to provide a brief history of the course. The golf course at Westmoreland Country Club was designed and built by Joe Roseman in 1911. During the 1940s and 1950s, all greens were rebuilt. Onsite, a 1-1-1 mix was used, the soil being our native soil. Greens 8 and 14 were the last



Waterwick on no. 15 green.

to be rebuilt, and they differed as a coarse sand was used. This mixture was very high in organicmatter content. The early 1970s saw the lengthening of the 11th hole and rebuilding of its green with imported soil, primarily clay. During the 1992/1993 golf course renovation by Arthur Hills, the 6th and 13th greens were rebuilt to USGA specifications.

The Decision

In November of 2001, International Sports Turf Research Center (ISTRC) sampled and tested all of the greens. ISTRC tested the greens for the following: infiltration rate, subsurface air capacity, water porosity, bulk density,

water-holding capacity, organic content 0"-4", organic content 4"-8", root mass and feeder roots. Needless to say, the results of these tests were both startling and disheartening. Our clay push-up 11th green had an infiltration rate of 0.00 [IN/HR] and an average organicmatter content of 5.6%. (Miraculously, this green has never had poor turf-quality issues.) Our "best" native-soil green had an infiltration rate of 3.00 [IN/HR] and an average organic-matter content of 5.0%. Matt Poulis from ISTRC probably summarized the condition best when he stated, "This was probably pretty good soil at one time---maybe 65- to 75-thousand years ago."

Up until the early to mid-1980s, this poor soil actually sufficed as an acceptable growing medium for quality turfgrass conditions. It was in this time period that some premier courses, including (but not limited to) Augusta National, began dramatically raising the bar, in conjunction with golfers' expectations, by lowering mowing heights and increasing the overall speed of the playing surfaces. Sand topdressing, brooming and verticutting all became standards. These new standards, combined with

green mowing heights eventually being lowered from 0.200 to 0.100, have had an impact that has reverberated through the industry and dramatically affected the turfgrass quality on Westmoreland's greens.





Westmoreland Country Club clubhouse.

Aggressive Green Aerification: A Case Study (continued from page 11)

Based on these results, it was recommended to the board of directors to completely rebuild the greens to USGA specifications. Due to the primary cost of the construction, the secondary cost of the loss of revenue and the tertiary cost of inconvenience, the board opted not to pursue the ideal option of rebuilding. This decision gave us an unenviable task-find an alternative method/methods to improve our greens from the surface, down. The initial idea (prior to the ISTRC test results) was to methyl bromide the greens and reseed with one of the newer bentgrass cultivars. As this idea was pursued, it became obvious that some degree of soil modification was necessary. With input from various committees, the project started to morph into what most, if not all, superintendents are familiar with. (An unrelated example would be, "Well, if we're going to dredge the ponds and install a new irrigation

analogy: "If you're going to build the house of your dreams, it probably doesn't make much sense to build it on a poor foundation." With that in mind, we finally recommended pursuing the soil-modification program. We felt that once we had worked the soil into a decent growing medium, it would then make sense to pursue (if necessary) regrassing. This approach would also buy us some time to remove trees around greens and install a new irrigation system, both of which would be essential if we eventually opted to regrass.

The Process

In April of 2002, we aerified the greens using the Ryan GA-24s with 5/8" tines. We collected the cores, gradened the greens in two directions, overseeded with A-4 and used subcontracted labor in conjunction with our crew to push-broom sand (45 tons total) into the aerification



No. 18 green after completion of the Waterwick. (Note scarring in bottom-right corner.)

system, maybe we should reconstruct the bunkers, and if we're going to reconstruct the bunkers and dredge the ponds, well then maybe we should build some new tee boxes with the dredge material." Etc., etc., etc.) The cost of regrassing the greens, approaches and green surrounds (the latter to provide a buffer zone against *Poa* encroachment), soil modification, and loss of revenue was still extremely expensive. We decided to try to simplify the process using the following holes. The soil-modification program began in earnest on October 7, 2002 when the Waterwick machine arrived. The Waterwick is basically a threepronged vibratory plow pulled by a Case maxicreeper. The plows are on one-foot centers, and "cut" a 5/8" wide by 12" deep trench into the ground and backfill the trench with the superintendent's desired material. Initially, we entertained the idea of only running the Floyd McKay drilland-fill machine to modify the soil.

This is a machine that can drill (at maximum) a 1" hole to a depth of 12". Over a four-year duration, Congressional Country Club in Bethesda, Maryland used the Floyd McKay no less than 60 times on the Blue Course greens in preparation for the 1997 U.S. Open, effectively modifying the greens mix. Congressional had poorly built USGA greens. The sand used to construct the greens had a rounded particle shape, creating poor growing conditions, therefore Congressional used an angular sand to improve the growing medium and firm the playing surface. Although Congressional was dealing with different soil conditions, the theory remained the same: out with the bad, in with the good. Congressional had two advantages over Westmoreland: first they owned a drill-and-fill machine so they could use it at any time, and secondly they had four years to complete the process as many times as possible. At Westmoreland, we were presented with a minimal amount of time for soil modification, and we had to subcontract the machines. After further research, we discovered that it was only realistic to drill and fill a green four times without hitting holes previously aerified with the machine. Discussions with Dan Dinelli at North Shore Country Club provided a valuable insight into a potential pitfall using this method. (After we complete the process and we get major rainfall in late July or August, "Where does the water go?") If we were to encounter this scenario, we would have effectively created a bathtub and thus increased the potential for catastrophic failure.

We first encountered the Waterwick machine during the 2001 GCSAA national conference. Here was a machine that could incorporate 10 times the amount of sand (versus the drill-and-fill) and provide subsurface drainage to greatly reduce the bathtub effect created by the drilland-fill. It was felt that although this machine had been seldom used on greens, it would provide an excellent starting point in addressing the soilmodification and drainage issues associated with our greens. The Waterwick process began October 7, 2002, and we completed 210,000 square feet on October 26, 2002.



Drill-and-fill machines in action.

In 19 days of using the Waterwick machine, we incorporated 420 tons of flint 12 silica sand into our greens. The flint 12 silica sand was chosen for its drainage capabilities and its compatibility with our existing soil and topdressing material (this required additional testing using ISTRC). Another 60 tons of sand was incorporated with a single (double on selected greens) pass with the drilland-fill machines using 1" drill bits to a depth of 10", and the greens were rolled several times with a one-and-ahalf-ton vibratory roller. Following these processes, we conventionally aerified with 1/2'' tines on the Ryan GA-24 quad-tine package. We collected the plugs and used 100 tons of sand to fill the aerification holes. Once we had completed the conventional aerification, we gradened the greens in two directions, overseeded with A-4 and T-2 bentgrass and topdressed with an additional 30 tons of sand. Just prior to the winter of 2002-2003, the greens were blanketed with 60 tons of sand. In the spring of 2003 we vertidrained the greens using 3/4" hollow tines, followed by 1/2'' tines on the quad-tine package and gradened in one direction. After overseeding with A-4 and T-2, we were able to incorporate another 125 tons of sand. We repeated this process in the fall of 2003 and again in the spring of 2004.

Results

ISTRC again tested the greens in August of 2003. These results indicate that on average the infiltration rate has increased by 0.75 [IN/HR].

Organic matter on average had dropped one full percentage point. The 2003 season was difficult at Westmoreland because of the cosmetic "scarring" that remained after the Waterwick process. Even though we had incorporated a tremendous amount of sand, the playing surfaces remained bumpy and there were areas on the heavier-soiled greens that remained "heaved" despite countless rollings with the one-and-a-half-ton vibratory roller and Salscos. Frequent topdressings (60 tons of sand applied on a three-week average) were used in an effort to smooth the playing surfaces. To eliminate the "scarred" areas, we used A-4/T-2 plugs from our nursery, in addition to an increased overseeding practice. The Waterwick is an aggressive machine, and not for the faint of heart. Any greens that had a poor root structure prior to the process (less than 3'') were at the complete mercy of the machine and received the highest percentage of damage. High-percentage Poa and shaded areas were the most susceptible. "Scarring" in these areas remained until the spring of 2004. From an observational standpoint, there are several encouraging observations that have been made on the greens this season.

1. The drainage is vastly improved—prior to the process a half-inch of rain at midnight was enough to disrupt/cancel our a.m. greens-mowing schedule.

2. The root structure is improved. Our average root depth varies between 4-1/2'' to 5-1/2''. (continued on page 15)



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When our cup-cutters find a drill-andfill hole, vertidrain hole or Waterwick channel, the root depth varies from 9" to 16" and fortunately we have a high percentage of these areas.

3. The overall plant health and turfgrass quality is very good.

4. Prior to the process, green speed (specifically the lack of) was a major issue. We used to double-cut, double-roll, mow at 0.090, all in an effort to generate speed. Currently we can single-cut, single-roll and mow at 0.102 and easily achieve our desired speeds.

Obviously these observations must be put into perspective. The Chicagoland area to date has not received a true heat wave. From a grass-growing standpoint, Mother Nature has been extremely kind this year so our greens have not truly been tested-yet. In all honesty, it is perfectly acceptable with us if these weather conditions persist and the greens do not receive a true heat test. One observation that is readily apparent is that if the dog days of summer do arrive, we will be able to meet the challenge with much stronger turf than in years past.



Completed green.



One-and-a-half-ton vibratory roller.



Completed product.



FEATURE ARTICLE Paul Voykin Briarwood Country Club

September of My Years

In this exclusive for On Course, Paul Voykin looks back at his formative years and a legendary career that is still going strong.

I was born in Saskatoon but spent my childhood in red pheasant Saskatchewan where my parents homesteaded. We lived in a prairie sod house nestled up against a hill. Often-

> times, geese and chickens pecked for food on top of our prairie-grass abode. I wonder if Dr. Randy Kane or Dr.



The author, June 2004.



Paul in 1961.



Paul (R) with his son Dan and his late brother Peter at Newport Beach, CA in 2002.

Jim Beard ever had students in their classes with this type of background. I don't think so! The Cree Indian reservation was less than two miles away. A few times we had the honor of being invited to visit and admire their ancient dances. My parents loved the great outdoors and worked hard to survive during the Great Depression. My father was a skilled hunter and a sharp-shooter, not with a repeater or automatic Hollywood artillery but a single-shot .22 and a single-shell shotgun. Prairie chickens, partridge, geese and ducks, goldeye, pickerel and sturgeon were some of the wild game that we feasted on. Sometimes we ate like kings and queens and sometime we only had lard and homemade bread to eat and milk diluted with water. My father made bridles, halters and harnesses for horses, and he traded with the Cree Indians as well as doing farming. My father was a good man but he drank a lot and we never had any money.

> After a few years, we moved to Langham then to Blaine Lake then back to Saskatoon. And here I must tell you a story. The Saskatchewan government, during the 1930s, paid a bounty of one cent per gopher tail. There were thousands of gophers digging up holes all over the province. I was 7 years old and Peter was 5, and we collected 100 gopher tails. We walked a mile to the rural mailbox and gave them to the kindly postman, who took the tails to the Blaine Lake officials and a week later he brought back a dollar—all dimes! We gave the money to our mom. I'll never forget the look on her face as she took the thin dimes from the grubby little hands of her two small sons. Of all the things I have done in my long life, that was the best thing I ever did!

> My father joined the Canadian army when he was 41 years old. Dad was also a veteran of the first World War. By then I had two more brothers, Andy and Rodney. There is only me now. I believe Andy still has the record for the most touchdowns ever scored in one game for the Hilltops. Peter was a natural athlete and he shot in the 70s his second year in golf when he was only 16; he became a scratch golfer when we moved to Chicago. Rodney held the track record at Bedford Road Collegiate for many years; he was an artist and painted the centennial mural on the long walls of Bedford. As for me, I couldn't stand up on skates, miffed golf shots and got hit on the head by pucks, footballs and large hail. I am surprised I never got hit by lightning. Recently, I survived a

> > (continued on page 19)



tornado in Illinois and a 6.9 earthquake at the Seattle airport, coming home from a Canadian turf conference held in Vancouver in 2001.

In 1952, after seeing a work ad in The Star Phoenix, brother Peter and I traveled by CNR rail to Jasper Park, Alberta to work for the Canadian National Railroad. There was a famous golf course where "Pops" Brinkworth, the dean of western greenkeepers, was the pro and superintendent; "Pops" was our mentor and one of the finest men I have ever known. It was because of him and another man I will shortly mention that Peter and I got into the business. At Jasper, we met wonderful people from all over the world. Brother Peter was always asked to play with them. I would ask, "Mr. Brinkworth, what about me?" and "Pops" would say, "Go rake traps" on no. 5 (lots of bears and cougars there). The second year in Jasper, 1953, my all-time golf hero, Ben Hogan, came there to fish and relax after winning the British Open in Carnoustie, Scotland in July; he was still limping from his serious bus accident. The Scottish gallery called Ben "the wee iceman." He never went back again to compete. He said it was too far away. Ben's friend prevailed on this great athlete to play Jasper Golf Course and he did. By the way, he eagled the Jasper 13th hole, which is the only par 6 I have ever played.

Peter was made a foreman by then because he had experience working at the Saskatoon Golf and Country Club in the summer and playing junior hockey for the Humbolt Indians in the winter. At that time, the pro-superintendent at Saskatoon Golf and Country Club was Pat



Paul with the late Adolph Bertucci, some 35 years ago.

Flecher, who was the first Canadian pro to win the Canadian Championship at Point Grey Country Club. Pat's picture, donated to the club by my brothers, Peter and Andrew, hangs in the clubhouse. Anyway, back to Ben Hogan. Peter told the crew that Mr. Brinkworth gave us-even mepermission to watch Ben play the nine (I was now promoted to cutting greens with a hand-mower). Shortly after the 18 holes were played, "Pops" Brinkworth took his Ben Hogan white cap off (back then we all wore Ben Hogan white caps) and humbly asked the great golfer, "Mr. Hogan, could you please say a few words to my lads, it's their caddie banquet tonight at seven o'clock?" I think "Pops," on purpose, turned on his Scottish brogue just a wee bit.

Hogan looked at "Pops" with a smile and said, "Yes, I will," and was at the clubhouse promptly at seven. Ben spoke for one-half hour and one of the things he said, which I'll never forget, was that, "Golf is the only business you don't have to be a millionaire to live like one." Without going into great detail, I can vouch for that. Wonderful things have happened to me because of golf. I've had a great run at 73; I started my 44th year at Briarwood Country Club this May 1. They won't let me retire.

From Jasper, I went to the Henderson Lake Golf Club in Lethbridge, where I worked for a couple of years for Jeff Cook. I met my wife in Lethbridge and we had five beautiful children. Now she is back in Lethbridge.

The Cook Course at Prince Albert was named after Jeff's father, Hubert Cook, who was pro and superintendent there for 41 years. Ieff Cook was a wonderful boss, and our crew at that time consisted of me, another man and Jeff's wife, Phyllis, who cut rough for us a few days a week. She was probably the first lady in Alberta to work on the golf course, and she was good at it. We had nine grass and nine sand greens, which were converted to bent turf the second year. It was here I had my first great experience with wild grass, for reasons other than you might think. I blush as I tell you this true story. One day, as I was driving the old Jeep slowly toward 18 green to change the



At Medinah Country Club in 1972, Paul (L) and a past president of the CDGA look on as acclaimed architect Robert Trent Jones explains a hole diagram.

last pin, I saw in the tall grass a commotion caused by a woman on top of a man in a horizontal position, moving rapidly in lateral action, and definitely not aware I was watching them. I backed up the Jeep slowly and found Jeff just starting his lunch at the clubhouse. "Jeff, Jeff," I said excitedly, "there is a man and woman and they are, you know, you know, doing it." Jeff Cook looked up at me and without a smile said, "Paul, did you ask them if they had a golf pass?"

From Henderson Lake I went to Olympia Fields Country Club, a famous 36-hole facility near Chicago. "Pops" Brinkworth's son, Gordon, was the superintendent, and Peter and I were made assistants, Peter on the North Course and me on the South Course. After three years, I became a superintendent at nearby Calumet Country Club; then, after four years, I moved to Briarwood Country Club in the rich North Shore area of Chicago, a few miles away from beautiful Lake Michigan. I have been there ever since.

In August of 1976, I gave a controversial talk in New York to the USGA. It was entitled "Overgrooming Is Overspending." In essence, my presentation was simply that we superintendents should not overgroom the whole golf course so meticulously. Yes, concentrate even more on greens, fairways and tee management, but don't carry out the ridiculous wall-to-wall manicuring and overgrooming to such a steep degree that we are pricing ourselves out of the golf course business.

Leave some pasture land for wild animals, birds and flowers. Make the (continued on page 21)

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