BUNKERS

How to Meet Players’ Expectations Through Realistic Design, Construction, and Maintenance

By Lewis C. “Chip” Powell

The prominent role of bunkers in golf course design was secured during golf’s golden age as prolific bunkering became synonymous with the great designs of the likes of MacDonald, Tillinghast, Ross, Thomas and Mackenzie who employed a wide variety of styles to not only create strategy but “The Look” as well. In this current era of design the art of bunkering has reached new heights (or depths, depending on how you look at it) as designers have many times relied on sand to provide far more of “The Look” (a.k.a. eye candy) than strategic function.

Unlike today’s players, golf’s golden age players were not as interested in “fairness” and as a result placed far less value on the pristine maintenance of anything on the course let alone the bunkers. Fueled by unrealistic television images and excessive concern for fairness, today’s players have come to expect pristine conditioning not only on greens, tees and fairways, but on bunkers as well.

The daunting task of meeting players’ high expectations often with limited resources has left many of today’s golf course superintendents pretty much between a rock and the hard place. While it is tempting to want to think that the solution is as easy as using a power bunker rake or installing some miracle liner, the ultimate solution will require not only the efforts of golf course superintendents but a far better effort from architects and owners as well.

For starters, architects must focus more on designing golf holes for golfers and superintendents instead of photographers, even though this may result in not getting the recognition deserved for designing subtly brilliant golf holes that don’t photograph as well as those loaded with eye candy. In addition, architects must do a better job of educating clients and players as to what constitutes a great golf hole and that doesn’t mean the one that photographs the best.

Respecting maintenance budgets still leaves plenty of room to do more with less by placing smaller bunkers in strategic locations while eschewing the temptation to place gratuitous eye candy in locations that most often offer no challenge to the better players, continual frustration for higher-handicap players and excessive added expense to the maintenance budget.

Once the quantity of sand has been sensibly addressed, focus should turn to construction technique. Just as the USGA method of greens construction has become an industry standard, nearly all new bunkers are now constructed in a manner that meets demanding criteria for both sand type and drainage. At a minimum, all bunkers should be constructed with an extensive subsurface drainage system with lateral line spacing dictated by slope and native soil type. Bunkers should then be finished using 4-6 inches of sand carefully evaluated by a qualified soils testing laboratory with physical characteristics that provide high water infiltration rates, resistance to ball plugging and resistance to movement by high winds.

In addition to these base requirements, the quality of the native soils must be considered with measures taken to prevent contamination of the imported sand addressed at the time of initial construction.

Golf courses must honestly assess the conditioning expectations in bunkers versus the cost to maintain the quantity and style of the bunkers. Photo by Joel Jackson.

In recent years many new fabrics and spray-on polyurethane liners have been introduced that are effective with regard to preventing native soil contamination to the imported bunker sands. While these products offer benefits, they also come with the downside of significant initial expense and, if maintenance is not carefully performed, shortened life expectancy especially around the edges where the need is the greatest. If properly installed and maintained, these products all offer improved playing conditions, ease of daily maintenance along with extending the life of imported sand and drainage systems by preventing contamination from the extremely fine particles found in nearly every native soil encountered.

The bottom line is that liners must be looked at seriously and considered as part of the true cost of construction if pristine bunker conditioning on a day to day basis is the desired end result. How many courses would construct fewer bunkers if the true construction cost were addressed up front?

Finally and most importantly though is the fact that, even if properly constructed, the day-to-day quality of bunkers is ultimately more controlled by maintenance than any other single factor. The point being that great maintenance can make up for some construction deficiencies while poor maintenance can destroy the quality of the best-constructed bunkers.

Maintaining high-quality bunkers comes down to performing two basic tasks: raking and edging. And few would argue that both frequency and technique are the deciding fac-
And the Survey Says...

We posed a quick survey on bunker maintenance issues to several superintendents. Here are the responses of Shane Bass, St. James Bay GC in Carrabelle; Mike Bellino, DeBary G&CC in DeBary; Greg Kriesch, Heritage Palms in Ft. Myers; Chris Neff, Timuquana CC, Jacksonville; Matt Taylor, Royal Poincian GC, Naples; and Craig Weyandt, The Moorings Club in Vero Beach.

Q: Do you machine-rake or hand-rake?
Bass: We machine-rake three days a week and the other four days we hand-rake only the bunkers that need attention.
Bellino: We machine-rake the center and hand-rake the edges. It takes two men about four hours to do this.
Kriesch: We machine-rake the bunkers. It takes four hours 3.5 hours per day for 36 holes.
Neff: We Machine-rake fairway, but hand-rake greens bunkers.
Taylor: We have 36 holes. We machine-rake fairway bunkers and hand-rake greens bunkers. It takes three people 3.5 hours per course to rake the bunkers. One course has smallish greenside bunkers. These are raked by the greens-mowing person.
Weyandt: We machine-rake our bunkers. It takes one person 3 hours.

2. Do your bunkers have drainage installed?
Bass, Kriesch and Weyandt: Yes, they were built with drainage.
Bellino: Four new bunkers have drainage.
Neff: Yes, installed during the recent course renovation.
Taylor: Some bunkers have drainage but we also have installed drainage in others.
Walker: No drainage.

3. How many bunkers do you have and how often are they edged? Also how many people and how long does it take?
Bass: We have 62 bunkers. I have one person who takes care of the bunkers completely. He is the only one in the bunkers except for someone to rake them on his days off. He edges about four or five holes per week and flymows the ones with fingers every time we mow roughs. It takes him about 5 hours to machine-rake all the bunkers. After raking the bunkers he edges about four or five holes a week. He also hand-sprays any weeds in the bunker collars.
Bellino: Our 56 bunkers are edged monthly. It takes four men two days to complete the task.
Kriesch: We have 36 holes. There are 88 bunkers on the Royal Palm course and 76 bunkers on the Sabal Palm course. It takes two people per course about 20 hours to edge the bunkers over a 4.5–5-day period. Our edging cycle is once every two weeks in summer. Every three or four weeks in cool season.
Neff: We have 76 bunkers that are edged biweekly. It takes two men four hours to edge them.
Taylor: 36-hole layout. One course has 42 bunkers the other has 57. They are edged biweekly. On each course it takes six people four hours per course to edge the bunkers.
Weyandt: We have 38 bunkers. It takes four men two days to edge the bunkers.

4. Have you ever had to modify bunkers to prevent chronic washouts?
Bass: No, but that is why you need an architect who understands maintenance (ours was Robert Walker) and why the superintendent needs to be there from the very beginning.
Bellino: Yes. On some with steep faces that had chronic washouts in heavy rains we sodded the bunker faces.
Kriesch, Neff, Taylor, Walker and Weyandt all replied No.

5. Do you do anything special to firm up the sand to improve the lie of the ball?
Bass, Kriesch and Neff: No
Bellino: No. I seem to get more comments when we are watering a lot or if it's raining a lot, that the bunkers are too hard. We have a homemade attachment for our sand pro with 5-inch rebar spikes to loosen up the sand.
Taylor: Not really, but we use 37M bunker sand. We have the standard rake assembly on our Sand Pros that is used when the bunkers are wet. If the sand is dry we install brushes on a separate Sand Pro. This helps to keep them from getting too soft.
Weyandt: We use 37M sand, which firms up nicely. We only cultivate one inch deep when raking.

6. Please make any additional comments regarding bunker maintenance tips as you see fit.
Weyandt: The most important thing about bunkers is construction. Know where the water is going to go to prevent washouts. Install drainage in bunkers at the time of construction. A little time spent in the beginning during construction will save hours of time repairing washouts later.
Neff: Tell everyone to take Bob Randquist’s bunker class at the GCSAA show if he continues to teach it. It really makes you think about bunkers and how they fit at your club. Bobby Weed did outstanding job of bringing bunker play back into the game at Timuquana CC. My outlook is consistency from the chipping green to the 18th hole throughout the golf course. We are very conservative when it comes to edging the bunker. We don’t look for sharp edges like some courses. We try to keep our contour definition but without shaving the edge. We don’t rake bunkers every day as well. I try to keep them a little on firm side barring effects of weather and playing traffic.

Every winter one project is the addition of new sand throughout the golf course. Depths are checked and additional sand is applied only if needed. We do not rake the edges every time. We rake the bunker completely one day including the edges and the next without. It’s kind of like mowing a green without mowing a cleanup pass to save the edge of the green. We try not to build up sand on the edges too much. I will be looking at different varieties of grasses on faces of bunkers over the next few years. We are discussing a possible renovation of bunkers and we might consider some of the new bermudagrasses or zoysiaagrasses for a different look. Also, the addition of small pop-up heads around the bunkers is becoming more and more popular. This is almost necessary with the higher standards now being demanded throughout the industry.

Having the opportunity to work five Players Championships and a U.S Senior Amateur has really opened my eyes to different beliefs on bunker maintenance. Is there really a perfect bunker in this world of golf? Understand the level of expectation for bunkers from your club, depending on the type of facility (public, private, resort, etc). Then develop your management programs to meet expectations. But it is still a hazard in the end isn’t it?
tors that truly make the difference with regard to both aesthetics and playability.

With regard to edging, light and frequent should be the mantra if consistent quality is the goal. Staying on top of edging offers the benefits of better day-to-day eye appeal and most importantly less disruption of the native soils that are a constant threat to contaminate imported sands. Frequent edging does require adequate labor resources and any club that demands high-quality bunkers must address this as a true cost of maintenance.

Frequent is also a key with regard to raking but, just as important as frequency, is how the bunkers are raked. While power rakes are well suited for removing footprints and preventing weeds from thriving in very large and flat bunkers, they are ill suited for raking smaller bunkers and those with any type of flashed sand. While many creative attempts have been made to mitigate the destructive aspects of factory-installed rakes, the best power rakes are still no match for the results obtained by careful hand raking. When was the last time you saw a tournament course on TV with bunkers not raked by hand?

Once again, hand raking requires adequate labor resources and any club that demands high-quality bunkers must address this as a true cost of maintenance. I repeat: how many courses would construct fewer bunkers if the true cost to properly maintain them were realistically addressed up front?

The challenge of meeting high player expectations with limited resources is one that does not appear to be going away anytime soon. Meeting this challenge will require all parties involved to honestly address the role of sand on our courses by creating realistic construction and maintenance budgets.

For new courses, this will require making fundamentally sound decisions about the style and quantity of bunkers as the design of the course develops. For existing courses, this will require an honest assessment of conditioned expectations matched with maintenance resources and the realization that the ultimate solution will most probably require the rebuilding of all improperly constructed bunkers and the possible elimination of sand in order to find the proper balance.

Golf Course Architect Chip Powell.

---

We can do the same thing for your trees – GUARANTEED!

Do you have sick yellow trees? Do you have some “Key” trees you’re worried about? Don’t cut down another tree needlessly – Save those trees – Treat them with EmeraldTree. Over 95% of our treated trees regain color and vigor and we guarantee the treatment to last a minimum of THREE YEARS!! We now offer the Arborjet insecticidal system to protect your trees from Bark beetles. Call Neal Howell @ 251-402-9848, Robert Howell @ 561-523-1295 or call toll free @ 877-779-TREE (8733). Visit our web site @ WWW.Emeraldtree-inc.com.
Professional Cup-Hole Cutting

By Michael Hoffman

The most valuable areas of a golf course are the greens and any activity that occurs on the greens should be the most meticulous, cautious and professional activity that transpires anywhere on the golf course. I have developed the following procedures over the years to help me and others do a thoroughly professional job of cup hole cutting and cup hole painting for daily operations and for tournaments.

Cup Hole Cutting Procedures

Determine the hole position either from a designated pin sheet or by using an approved rotation system as designated by your club. When using a pin sheet, pace the depth measurement from the front edge of the green and mark that dimension with your tool/sand container and then pace off any left or right distances.

For example a pin location designated 14/8 would be 14 paces from the front edge and 8 paces from the left or right edge as indicated on the pin sheet. Single numbers mean the location is in the center of the green.

Now that the position is determined, if you are using a twist-in or rotating-cut hole-cutter, hold the cup cutter 18-24 inches above the green and release it. I have found this produces a cleaner hole edge than just placing the cutter edge on the surface and twisting it in. Using this drop-release method, the cutter will generally penetrate the green surface 1.5-2 inches. Remove the cup cutter from the hole.

Release the grass plug into the container; wipe off the outside of the cutting cylinder with a towel. Carefully insert the cup cutter into the new starter hole. Bring the cup cutter to a perpendicular position by centering the level. Rotate the cup cutter left and right, exerting a downward pressure until the standard 7-inch depth is reached.

Please note that this should be done slowly while checking the level during the process. There are various devices and stops that can be used to indicate when the hole has reached the required depth when using the two-plug cutting method. I have found that by measuring 7 inches from the top of the scallops on the cutting shell and then painting a mark or applying a high visibility tape just above that mark gives me a good guide to achieve the proper regulation 7-inch overall depth.

Now slowly twist the cup cutter while at the same time lifting up on the handle to remove the cup cutter and plug from the hole. It is important to do this slowly to prevent soil from falling out of the cut cutter cylinder. If soil does fall out, carefully replace the cup cutter back into the hole. Once the cutter is all the way down in the hole, lift it up 1-2 inches and then gently push down to recapture the soil that fell out. Again, slowly remove the cup cutter with a slight left/right rotation. Place the cup cutter into the container.

Clean off the inside and outside of the cup. With both hands insert it into the new hole rotating it left to right until the top of the cup is 2 inches above the green. With the water bottle apply a small amount of water around the outside of the cup. This will help keep the edge from drying out during the day. Also apply a small amount of water inside the cup. This can remove any residue that was not wiped out. It also helps clean the ferrule hole of any sand, dirt or debris that may cause the flagpole to bind. If you want to pre-check the flagpole angle to make sure its perpendicular and not leaning before using...
the cup setter, place the flagpole in the cup while it is still elevated slightly above the green. If it is leaning slightly, move it to perpendicular while in the cup and gently compress the area around the cup. Remove the flagpole and insert the cup-setter tool.

Insert the cup setting tool into the cup. Push down firmly until the rim of the cup setter touches the surface of the green. It is important not to force the cup setter. If you do not achieve full depth and surface contact with firm foot pressure, the hole was not cut to the proper depth. Remove the cup setter and cup and repeat Step 2. Remove the cup setter with a straight upward pulling motion. Do not twist or rotate the cup setter when removing it as it can damage the edge of the hole. Replace the flagpole and check to make sure it slides easily in and out of the ferrule.

To replace the plug in the old hole, clean off the cutting cylinder before you insert it into the hole. Place the cylinder into the hole making sure it is all the way to the bottom of the hole. Release the soil plug while keeping the cylinder contacting the bottom of the hole. Once the soil plug is released, remove the cylinder from the hole. To ensure the soil plug is all the way to the bottom of the hole — reinset and repeat the above steps. This helps prevent any possibility of the soil plug from sinking.

Remove any debris from the grass plug. Measure the thickness of the grass plug with your thumb. Use your thumb mark to measure how much, if any, soil you need to remove or add to achieve a level plug replacement. Gently insert the grass plug into the hole at a slightly tilted angle pushing in the front edge of the plug first towards the back edge that is inside of the hole. Push down on the plug so that it is level with the surrounding surface.

Use a ball mark repair tool to mesh the edges of the plug with the green’s surface by inserting the tool about 1/2 inch in from the edge of the plug and twisting the tool outward. Sprinkle a small amount of water over and around the plug. This will help promote faster regrowth.

Finally, with very slight pressure tamp the plug with your foot. Sometimes a very slight twisting motion with your foot will help mesh the edges. The tightness of the plug is critical. Test the surface around the plug for firmness. It should feel the same as the plug.

**How to Paint Cup Holes for Tournaments**

The operator should have the same items utilized in daily cup hole cutting with the addition of the following items:

- Spray paint hole cover device
- Two cans of white hole paint
- Small cloth 8 x 8 inches
- A damp 24 x 24-inch overspray towel with a 5-inch diameter hole cut in the center

After the cup hole has been cut following the previous guidelines, the following procedures are to be used when painting the cup hole.

Prior to setting the cup with the cup setter, insert a small rag into the cup to cover the bottom of the cup.

Set the cup with the cup setter. Place the spray paint hole cover device into the cup.

Place the damp 24" overspray towel around the cup hole cover device.

Insert the spray paint can nozzle into the cup setter, place the flagpole in the cup while it is still elevated slightly above the green. If it is leaning slightly, move it to perpendicular while in the cup and gently compress the area around the cup. Remove the flagpole and insert the cup-setter tool.

**Rules of Thumb**

*Left: Use your thumb to measure the remaining depth of the soil plug to the surface.*

*Below: By checking the "thumb length" on the side of the grass plug, you can judge how much soil to remove so the plug will fit properly. Photo by Joel Jackson.*
Begin to spray by rotating the paint can 360 degrees clockwise. It is important to note the starting point for the spray pattern to avoid overlapping the paint. One 360 degree rotation is sufficient.

Remove the overspray towel.
Remove the hole cover device and place it into the hole cover device.

Mike Hoffman demonstrates an easy way to check and adjust the straightness of the flagpole by inserting it in the cup before it is set to its final depth. Photo by Joel Jackson.

**Unlock the Natural Beauty of your Turf with GreenEdge**

- GreenEdge formulations are bio-based and contain slow release organic N-P-K and micronutrients.
- GreenEdge contains plant extract to increase stress resistance and humic acids to increase nutrient uptake.
- With over 20 original formulations to choose from, or custom blend GreenEdge to your specifications.

Call toll free for distributor information
1-877-GREEN30
GreenTechnologies, LLC

**Upstart Products, Inc.**
GreenHoveer Brushes
Fits Toro, John Deere & Jacobsen
CASCADE PLUS LIQUID OR GRANULAR
PHYTO-FOS Fast Release Systemic Phosphorous
AMINO ACID BIOFERTILIZERS Quatran-C — Quatran-K
Macro Subs recommender — Macro Subs Julian
1 800 203 5629

**AFFORDABLE aerial imagery**
- Renovation Planning
- Irrigation Management
- GPS Mapping

www.ragantechnical.com
dave@ragantcnical.com
Ragan Technical Solutions, Inc.
RTS 561.776.9713

**SPREADRITE, INC.**
CUSTOM SPREADING FERTILIZER • DOLOMITE • GYPSUM ARAGONITE • HYCAL LINE
FAIRWAY TOP DRESSING
LAMAR SAPP
ART SAPP
6001 S.W. 19th STREET PLANTATION, FL 33317
MOBILE: 772-201-4000 (ID 138-81-10962) 954-444-0820
on the towel to avoid getting any drips on the green.

Rotate the small cloth that is in the cup so that it collects any paint that is on the cup interior. Remove the cloth from the hole.

Following these procedures will give you better results in your hole cutting and painting operation.

We have a 5-6 minute video available that demonstrates the entire hole-cutting procedures step by step, from pacing off the hole location to cutting the hole and replacing the plug as noted in this article, as well as some other helpful tips to improve your hole cutting process. The video is available in English or Spanish. Email: flachoff@cs.com or call 352-223-1900.

Editor’s Note: Mike Hoffman has many years experience in the golf course industry in golf operations and maintenance. He is currently the golf course maintenance service manager at the Isleworth G&CC. Hoffman is responsible for daily course set up, detailing and quality control. Hoffman has authored articles for various golf publications and holds several patents for golf course tools including the AccuPro cup cutter and a cup cutting level.

A moist clean towel with a 3 inch hole cut in the center catches any overspray when painting tournament cups. A small cloth in the bottom of cup during painting is used to clean the sides of the cup as needed. Photo by Joel Jackson.

Sanding Tool

The UniPar sanding tool easily and quickly dispenses green sand to fill ball marks on the green. Using the UniPar tool like a pepper mill a light application of green sand can be made to blend in the edges of the replaced plug. Photos by Joel Jackson.
Spreading the Good Word

By Darren J. Davis

If you have read previous “Super Tips” in *The Florida Green*, you know that I generally highlight unique tools or innovative solutions that my peers have developed. However, in this installment I am going to take a different course and speak on a topic that is near and dear to me — communication. This Super Tip will focus on communicating our value to others, or “spreading the good word” about the golf course management profession.

It is rare to come across a report that highlights the challenges, issues, and hard work of a golf course superintendent. However, it is all too common to stumble upon negative reports or viewpoints of the golf course industry and those connected with the vocation. For this reason, it is my belief that each of us needs to step out of our comfort zone and become diligent promoters of the trade that provides immense satisfaction and gainful employment.

When most people think about the duties of a golf course superintendent, they think about our agronomic responsibilities. If they have been educated about the profession, they might also understand the business aspect or people-management side of our vocation. However, those not directly connected to our line of work often are unaware of the countless auxiliary duties that we perform on behalf of our employers, those things that don’t fall under the typical golf course superintendent job description. One example is the massive fund-raising efforts we undertake to subsidize turfgrass research that directly benefits our employers. A second example, and the topic of this article, is about promoting our profession to portray our occupation in a positive manner.

Many things I do relating to the golf course management profession come from suggestions or ideas that I have gained from my peers. The idea that I am writing about in this “Super Tip” came primarily from Joel Jackson, the commander and chief of our terrific magazine, *The Florida Green*. Shortly after my fellow FGCSA board members and I were fortunate enough to entice him into early retirement and come aboard as director of communications for our association, Jackson began submitting short educational articles to golfer-oriented magazines and newsletters in the Central Florida area.

**Florida Golf Central**

**Golf Is Our Game**

These publications are distributed to golf course pro shops and retail outlets and are read by golfers, the people whom we superintendents are trying to influence and educate about the profession.

The idea stuck with me, and it resurfaced one afternoon last year when I was grabbing lunch at a nearby sandwich shop. While I waited for my hot Italian sub to be prepared, I began thumbing through a local ball and stick publication that was on the rack next to the *Homes and Land* magazine. In browsing through the magazine, I recalled the numerous articles that Jackson wrote and subsequently shared with the FGCSA board. After I finished my lunch I returned to the office with a copy of the publication.

So I wouldn’t forget, I immediately e-mailed the publisher with the question, would he like me to supply him some editorial at no charge? Like many regional publications of this type, it provided its readers with scores, names of golfers who had holes in one, an instructional golf tip, and sometimes a few photos of area golf events. The editor responded to my e-mail with, “No promises but go ahead and send me something.”

This email began a long-term relationship which has provided me an outlet to spread the good word on the positives of the profession and the hard work of my peers.

Just as Jackson was not looking for praise for his efforts, I am not seeking recognition for mine. I can honestly say that the most rewarding outcome of me writing for the local golf magazine is when one of our peers reaps the benefits of having a golfer recognize what it is that their golf course superintendent does for them. The intended outcome of this editorial (Super Tip) is not to draw attention to Jackson’s or my efforts, but rather entice others to follow suit.

So if you are asking where do I start? After getting the green light from a local publication, I suggest you look at your previous submissions in your club newsletter. More than likely with just slight modifications those articles will work well in this format.

My first few submissions came from stock articles that Jackson provided me and I modified to fit with my region of the state. Since then, I have submitted my own work monthly, 800 – 1200 words on topics including “Off the Beaten Path,” an article on golf-car traffic and its devastating effects on turf; “Green Speed”; “Golf and the Environment,” an editorial that highlighted the numerous positive impacts a golf course has on the environment and the community; “Water - A Precious and Expensive Resource,” a discussion on the efforts made by golf course superintendents on water reduction; “The Augusta Syndrome – TV Golf is not a Reality Show;” “Jack of all Trades – A Look at Today’s Golf Course Superintendent;” “The Language of a Golf Course Superintendent - A Primer of Terms”; “Grain or Grade,” a discussion on the realities of grain on putting surfaces; “The Summer Culture – Cultural Practices Require Golfer Patience,” and “Bunkers – A Hazard of the Game,” an article that depicted the time and money that is poured into an area of the course that was once truly considered a hazard.

A few suggestions: remember your audience and speak on their level, prepare several editorials at once so that you can always meet your deadline, and finally submit your own photography so you can further highlight the issue you are addressing.

So what are you waiting for?
Spread the good word!