

Stacie Zinn Roberts



According to USGA-funded research, the right sand for bunkers “maintains firmness, drains quickly, does not easily erode from slopes,” and is similar in size to the sand used in root zones. Photo courtesy of Rain Bird Corp.

(bunkers)

The quest for the perfect sand

At the heart of every great bunker is a great bunker sand. Knowing what to look for (and where to look for it) is the key to making the right choice for your golf course.

With a sand wedge in hand, a golfer approaches a deep bunker on your golf course. As he walks up to the edge of the hazard, he squints and sees it. The top of his ball, barely visible, is nearly buried in the sand — the dreaded fried-egg lie.

He bellows out a swear word, cursing himself for his lousy play. And he may be right. He may have hit a bad shot. Or, if the sand in that bunker was not chosen correctly by the golf course architect, the club owner, or you, the superintendent, he may be wrong. That fried egg might not be his fault. It might be yours.

That’s right — sand selection can and does impact playability. It can also affect bunker maintenance, drainage and overall course aesthetics. That’s why selecting not just the prettiest sand but the right sand for your golf course is so critical.

In a study published by the USGA in 2008, Cale A. Bigelow, Ph.D., and Douglas R. Smith, Ph.D., at Purdue University described the general guidelines for bunker sand selection this way: “From a golf course manager’s perspective, an appropriate sand for golf course bunkers would be one that maintains firmness, drains quickly, does not easily erode from slopes after moderate rainfall or irrigation, and is sized similar to those used for sand-based root zones so when



Golf course architect Jan Bel Jan says superintendents should choose the same type of sand for bunkers and topdressing. Photo courtesy of Jan Bel Jan

“The more angles it (a sand particle) has, the better it sticks. The better it sticks, the less it will wash.”

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it is splashed onto the putting surface it does minimal damage to the mowing equipment when picked up during mowing and does not negatively impact the composition of the sand-based root zone over time.”

Rules of thumb

Golf course architect Jan Bel Jan, who is based in Jupiter, Fla., says within all of those criteria, her general rule of thumb in selecting a bunker sand is to choose the “same sand you’ll use to topdress.”

But even with that rule of thumb, the USGA research cites several criteria for sand selection, including particle size and shape, which determine whether sand is too uniform or too soft and will produce washouts or fried-egg lies.

“You need a variety of particle sizes,” says Bel Jan, a member of the American Society of Golf Course Architects and a 20-year member of GCSAA.

USGA recommendations for root-zone sand mix and the research on bunker sand line up for particle size distribution. A majority (at minimum, 60 percent) of the sand

particles in the bunker-sand mix should be medium and coarse sand in the 0.25-1.0 mm range. No more than 20 percent should be fine sand (0.15-0.25 mm), and less than 10 percent should be very fine sand, silt or clay (0.002-0.15 mm). At the opposite end of the spectrum, less than 10 percent should be very coarse sand or fine gravel (1.0-3.4 mm).

“Some bunkers have a crust on them. You walk through and leave holes like poking into a pie crust,” Bel Jan says. Bunkers that crust generally have too much silt or clay in the sand mix.

Particle shape is also important. Bel Jan says having sand all the same “spherical shape, like marbles” is undesirable. Instead, she says, “The more angles it has, the better it stacks. The better it stacks, the less it will wash. It will be more stable and prevent the fried-egg lie.”

The USGA research measures shape by examining relative sharpness of the edges (angularity) and the overall shape (sphericity or roundness).

“These characteristics can have a strong influence on surface firmness and resistance to erosion,” the USGA report says. “For example,



Bob Farren, CGCS (second from left), and his crew stand in the rough at Pinehurst No. 2, where native sand from the site is used for bunkers. Photo by John Gessner

a low-sphericity, very angular sand generally has a high surface strength and would likely stay in place in bunker faces. By contrast, a high-sphericity, rounded sand is more likely to be soft and more prone to erosion during regular maintenance or following irrigation and rainfall events.”

Sand type, source and amount

The material the sand particle is made of should also be evaluated. The USGA research says silica sand is “preferred since it resists weathering and retains its original shape longer.” While other materials may be suitable for bunker sand use, the USGA research warns “limestone sands are more prone to weathering” and may break down into finer particles over time, which “can affect drainage and playability.”

The location of the sand mine or source should also be considered. Using sand produced close to your location, as long as it falls within recommended specifications and ranges, could have a huge impact on bunker construction budgets. “Sand is heavy. If you have to ship it from somewhere, it could run \$15 to \$30 per ton, which could be the cost of the sand itself, or more. The sand could be \$15 to \$30 per ton,” Bel Jan says.

Finding local sand isn’t an issue for Bob Farren, CGCS, director of golf course and grounds management at Pinehurst Resort. The famed facility’s nine golf courses sit atop the Sandhills of North Carolina, and the use of local, native sand is part of the character and strategy of most of the resort’s courses, but especially Pinehurst No. 2. Designed by Donald Ross and restored to Ross’ original design by Ben Cren-

shaw and Bill Coore prior to the 2014 U.S. Open and U.S. Women's Open, No. 2 doesn't just highlight the local sand — it embraces it.

Before the restoration, Pinehurst No. 2 had 110 to 115 bunkers on the course, Farren says. Following the restoration, only "about 30 definable margins of turf" frame the bunkers that meander across the layout as an integral part of the design.

Most of the sand used on the course was from the site itself and falls within the guidelines recommended by the USGA. Additional sand comes from a sand pit 20 miles down the road and is of the same type and quality as Pinehurst's native sand. "We are spoiled because it's available to us locally," says Farren, a 35-year GCSAA member.

The amount of sand installed in a bunker, not just the type of sand, should be considered, Farren says. "Usually people put too much sand in them to begin with. Four inches is a good number. Most specs call for 4 to 6 inches. If I were to build one, I'd start at 4 inches. It's better to have not enough sand as opposed to having too much."

A colorful choice

Color is another factor to consider when selecting bunker sand. "It's important because it's one of the most visible aspects of the golf course. Everything else is green," Bel Jan says. "The bunkers will be some shade of white, cream, tan, beige, or, in the case of Old Works Golf Course, they could be black."

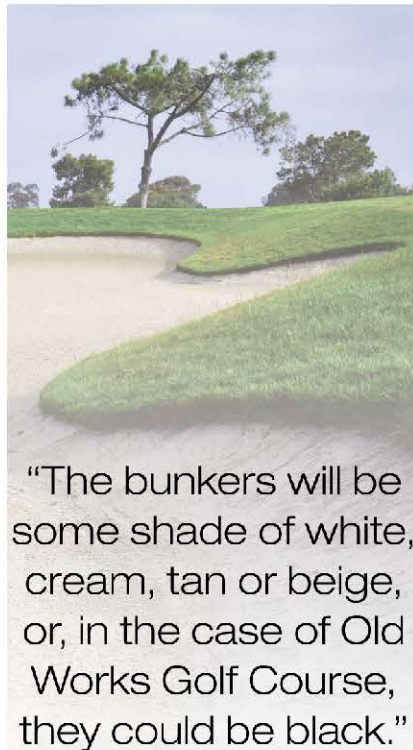
Yes, black.

Built on the site of a former copper smelting plant, the Jack Nicklaus-designed course uses black slag in the bunkers. The slag was the byproduct of the copper smelting process at the plant that operated on the site from the 1800s to the middle of last century.

"It's angular, not spherical like regular sand. If you grabbed it, it has the feel and the consistency of fine bunker sand, but it's heavy because of the metals still in it," says Josh Thurner, the GCSAA Class A superintendent at Old Works who has been at the Anaconda, Mont., facility for the past 16 years.

The slag certainly creates a signature look to the course, but Thurner says there's more to it than that. "You can mark me down as biased, but it doesn't compact, doesn't get soft, and just because of the way it lays, unless you really drive a ball, you never have a fried egg."

Though the material is not native, per se, it is locally sourced. A tremendous pile



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of the slag sits just outside of town. Thurner says the slag pile, if loaded onto railroad cars, would form a train that would stretch from San Francisco to New York City. Although the 12-year GCSAA member says he'd recommend the material for golf and landscape use, anyone wanting to buy it is out of luck. A company that uses the slag to make grinding wheels now owns that supply, and it intends to use most of the resource for itself. But don't worry about Old Works; they have been allocated enough of the slag for use in the course's bunkers for the next 150 years, Thurner says.

The greens at Old Works are built to USGA recommendations, but Thurner says he's not concerned about getting the slag into the soil profile. "I aerify the greens every year, and it's very uncommon to see slag in the profile. It doesn't travel very far, and the bunkers are not super close to the greens," Thurner says.

If there is a drawback to the black color of the bunker sand, it's the heat it generates. In summer, turf bunker edges can get a bit crispy if not hand-watered. On the bright side, though, Thurner says, "The bunker edges don't need to be edged as often because the heat stunts the growth. But it can be hard on my guys when they have to work in the bunkers, because it is hot."

Color coordinates

Color should be considered not just for look, but for the appropriateness to the location. At Old Works, it's indicative of the history of the place. At Augusta National, the bright white sand is so much of a signature that both Bel Jan and Farren alluded to something called "The Augusta National Syndrome" when it comes to white sand.

After watching the Masters on television, club members will often request the same sand at their course, Bel Jan says.

"They think, 'If it's good enough for Augusta, why isn't it good enough for me?'" That may be the only Augusta-type thing they can afford. It inspires people to want to have the same appearance at their club, whether it's right for them or not. Most people like the really white sand, but in some places, it's not as good as having something with a softer edge to it. In Florida, you get into very white sand with very intense sun, and it's blinding."

Farren agrees.

"The beauty of Augusta National is the sharp edges of the bunkers, the formality of it, but that's also the beauty of No. 2, the native area. There's no specific formula for success," he says.

Still, Bel Jan says, "If the membership likes the white sand, then that's fine. The color is just a matter of preference."

So, if color is the most subjective and the least important contributor to playability and ease of maintenance, Bel Jan suggests letting members decide the color.

"If the superintendent can find the sand that has good playability quality and good drainage quality, those should be the things that he selects, and then let the membership, the governors, pick the color. If you have three sands that are relatively equal, in three slightly different colors, let them make that choice. It's safer," she says.

Stacie Zinn Roberts is the president of What's Your Avocado?, a writing and marketing firm based in Mount Vernon, Wash., and a frequent *GCM* contributor.