

- Vertical mowing
- Thatch management via topdressing and core aeration
- Venting

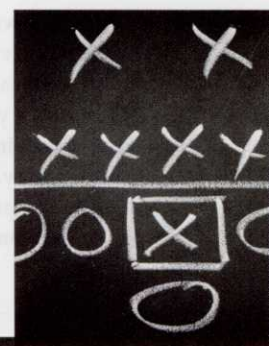
IRRIGATION. The largest single input to any golf course is water in terms of not only the number of gallons of water, but also the elements that are in that water. New greens built with materials at a pH of 7 can rapidly change to a higher or lower pH that reflects the pH of the water source. I am not sure if enough additives can ever be applied to overcome irrigation inputs especially in arid parts of the country.

In recent years there are a variety of tools that can be used daily or weekly to evaluate things such as percent of moisture in greens tracked via computer and/

or spreadsheet, evapotranspiration via a weather station, and salinity levels in the soil profile. All of these tools are used to develop a game plan for greens management and should be considered in the agronomic plan development.

FERTILIZER. Plant health is based on sufficient elements in the soil available for uptake by the plant to provide optimal growing conditions. The cost of fertilizers will only go up in the future as resources become scarcer. While timing may differ from year to year it is fairly easy to establish a game plan in advance. Know what level of nitrogen, phosphorus, potassium and micronutrients are required. And remember, all fertilizers are not created equal and let the buyer beware.

“ One of the earliest lessons I had in school taught us to calculate the cost of a fungicide per day of control versus cost per 1,000 sq. ft.”



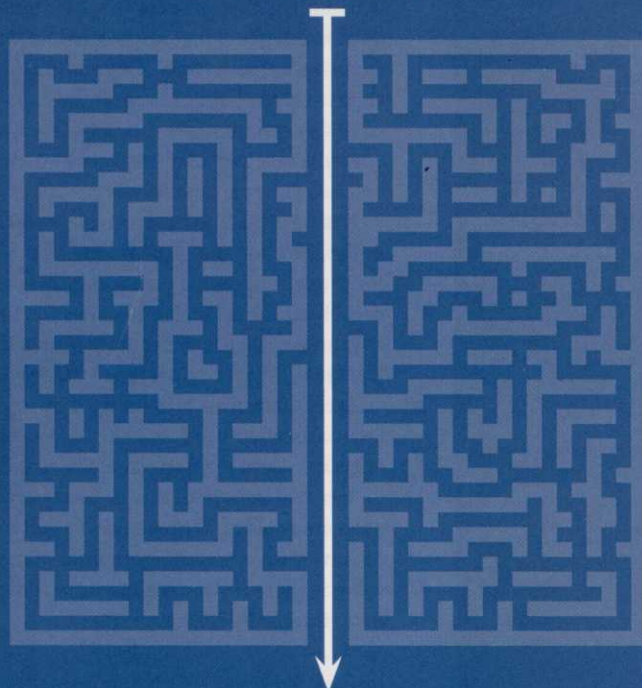
Be sure to evaluate what materials, what rates, what timing and ultimately the results achieved.

Understand the history of the turf performance. Know the soils on your property. It is likely there are pockets of clay, loam and sand all on the same property. Fertility may not be required on the same levels on different soil types. Roughs may not require

the same fertility and quality of fertilizer as golf greens.

Understand the relationship of fertility to pathogen activity. Higher levels of nitrogen enhance certain disease activity while lower levels of nitrogen can also impact the incidence of other diseases. The same is true for other nutrients. It is all about balance and timing.

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A golf course with 100,000 rounds would normally require higher fertility rates to recover from wear stress than a club with 25,000 rounds a year. Tournament stresses would also require greater inputs after an event for recovery. Aerification is a necessity but the healing process can be sped up by proper application and timing of fertilizer.

COMMUNICATING THE AGRONOMIC PLAN. Once the agronomic plan is developed then it is time to match the costs associated with it. All of these should align with the desired maintenance standards set forth by the golf facility. If the budget, the maintenance standards and the agronomic plan are not in line then goals will not be achievable with the resources provided.

“With a sound agronomic plan you have a playbook for the year ahead.”

I see golf courses with champagne dreams and beer budgets. That is an operation setting itself up for failure. Instead, be realistic with what it takes to achieve the desired results. In recent years I have seen many courses reducing their budgets but not their expectations. In fact, their expectations have risen.


Progressive superintendents utilize programmatic budgeting and get their clubs to buy into the levels of excellence they desire. Above-average budgets accomplish above-average results. However, every time a budget is scrutinized or fails to keep pace with inflation then programs suffer. Remember, it should be a joint decision as to the sacrifices that will be made when adjustments are made to an agronomic plan.

VALUE. Agronomic plans take time to be done properly. Not every superintendent has the skill set to put a proper document together. The best news is that there are a lot of resources and people that can help accomplish this process. Superintendents have many peers that are more than willing to share information. Depending on the time involved I might suggest the assistance of USGA agronomists, extension specialists, consultants, industry experts and trusted commercial representatives.

With a sound agronomic plan you have a playbook for the year ahead. This allows for proper budgeting on a monthly basis for cash flow for the facility. It allows you to take advantage of early order discounts because you know what your proposed usage will be.

Early planning allows for appropriate comparison of products that are safe and effective... and the best value for your club's dollars that are spent. Businesses operate off of business plans. Why wouldn't a golf course operate with a sound agronomic plan? The value is there if you take the time and effort to do things the right way. **GCI**

Bruce R. Williams, CGCS, is principal for both Bruce Williams Golf Consulting and Executive Golf Search. He is a frequent GCI contributor.




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MEDINAH MEMORIES

This month, I'm looking forward to the 2013 Ryder Cup matches at historic Medinah Country Club No. 3 course. Medinah is personally historic, because it's where I first played golf.

My best friend's family were members, and I often went with them to swim, ice skate, or toboggan. When my friend took up golf, he wanted me to try it, too, which we did, starting in the summer of my 12th year.

At first, we just hit balls on the practice range, or putted on their huge putting clock near the front entry. My first divot was actually on that green, rather than any fairway, attempting to launch one clear to the other side with a huge putter swing. I sheepishly looked around to make sure no one saw me – a maintenance worker did – and learned the art of divot replacement and ball mark repair on the fly right then and there!

I was hooked on golf from the moment I stepped on the property, mostly because of the beauty of Medinah, with its mature trees, lush fairways and huge clubhouse made me feel as if this – and not Green Acres – was the place to be. (Note: That is one of those Facebook-type questions to see how old you are...)

Late one day, with the course empty, we actually attempted my first actual golf round on the ladies' course, where we could start with a three-hole loop of holes No. 1, 17 and 18. He lined me up on the first tee and stepped aside as I took my first shot – a shank that hit him in the right ankle. In pain, he set me up again, and again stood aside. My second shank caught his other ankle, ending our first attempt at "real golf" as I carried him on my shoulders back to the clubhouse.

Eventually, we played that three hole loop, then nine, and finally 18 hole rounds. We played the ladies' and then men's courses depending on traffic, but, having studied the layout of the famous No. 3 on club placemats and ashtrays, I was determined to someday play the famed No. 3.

We often played dawn to dusk in virtual seclusion, usually on Mondays, hoping to avoid guest fees. All went well for a few years, until one day, we arrived at the then 17th hole (now 13th) hole on No. 3, only to see the pro sitting in a cart behind the green. After nervously putting out, he presented us with a stern lecture and a bill for \$140 in guest fees for my three rounds that day. That was beyond the means of a 15 year old in 1975, and I tearfully took the bill home to mom and dad, who then paid for what I couldn't afford, and never mentioned it again. However, my days of free golf at Medinah ended.

Medinah forever cemented my interest in golf course design. I studied the club's placemats, with the routing and hole layouts, and continually developed hole designs on napkins (eventually, as I like to tell Pete Dye, evolving to a higher plane with drafting boards, and finally CAD). In fact, I still doodle golf holes at every chance I get, and hotel maids must wonder just what those note pad doodles may mean.

My interest in golf design caused me to call my local golf course architects (and later, first employers) looking for information and possibly a job. Around that time, articles concerning the upcoming 1974 U.S. Open there trickled out, with one crediting George

We often played dawn to dusk in virtual seclusion, usually on Mondays, hoping to avoid guest fees.

Fazio (the 1949 third-place finisher at Medinah) with changes to the course. Knowing Killian and Nugent had done those changes, I was incensed, and tried to set the record straight, with little luck.

I watched the U.S. Open there, and disliked negative comments by Palmer and Nicklaus about the sharp doglegs on 13 (now 16) and 18, and on course conditions. That mature forest always makes ultra fast US Open greens difficult in the summer heat. The course dropped out of the top ten in national rankings, and has yet to recover.

As a teenager, I vowed to design courses just like Medinah. I never did, eventually agreeing with critics that the narrow fairways, deep woods, and deep bunkers left and right of most greens made for a tough, but not great course, and certainly not a fun one. I followed popular trends towards more numerous, but shallower bunkers for aesthetic, maintenance and pace of play reasons. Still, I like to believe that the "Spirit of Medinah" (the title of their excellent club history) shows in my work, because Medinah will always be first in my heart, if not my head.

I still follow every architectural change to No. 3, most recently by Rees Jones. As a golf course architect, I know the changes Rees made for the major tournaments are right, but in my heart, I wanted the course to remain as I remember it. Perhaps, I also hope for golf itself to remain as it was when I was 15. **GCI**



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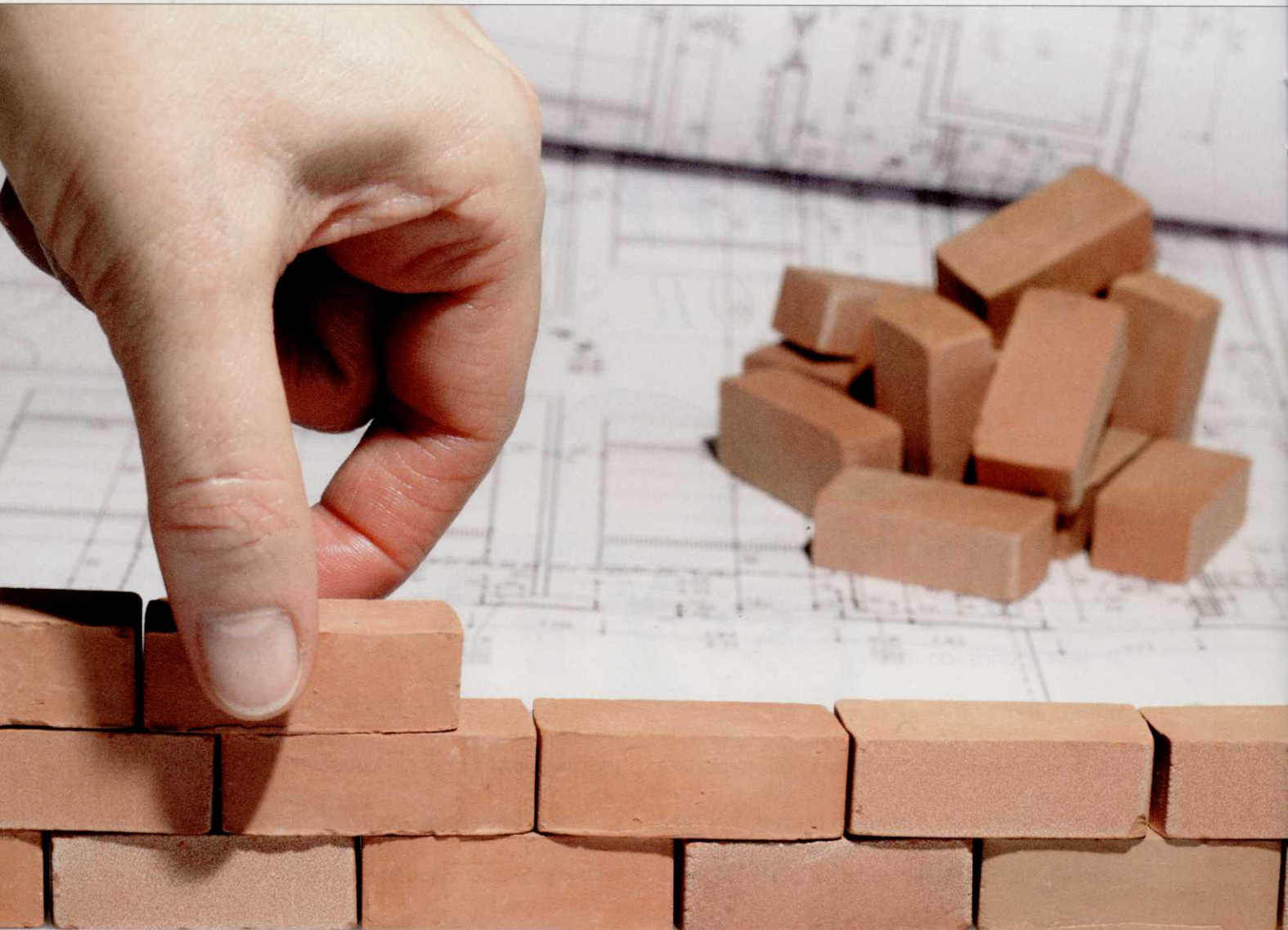
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Facility of Dreams

Build it and they will come. Actually, they should come before you build it. Consult with colleagues who have already completed state-of-the-art maintenance facility projects and you'll save yourself lots of trouble.

By Jason Stahl

Matt Shaffer, director of golf course operations at Merion Golf Club, Ardmore, Pa., has some advice for other golf course operators who are looking to build a brand-new maintenance facility: buy him, Aronimink Golf Club Superintendent John Gosselin and Pine Valley Club Superintendent Rick Christian dinner and a case of beer. Take them out, show them your plans and ask them what you're doing wrong.

Other than trying to cadge free vittles and booze, why does Shaffer suggest this? Because he, Gosselin and

Christian have all built a new facility within the last four years and learned a lot in the process.

One of the things Shaffer learned was that planning and building the maintenance facility – which in his case included chemical storage, equipment storage, boardroom, dorms, living room, men's and women's locker room, break room, wash bay, fuel station and loose storage area for sand and soil – was one of the toughest projects he ever undertook. Two grow-ins, building countless greens and redoing countless bunkers didn't compare to

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The miracles of science™



Michael Vogt: It wasn't until recently that a maintenance facility was considered a steel "building-in-a-box" with a concrete floor and several rooms in one end.

the blood, sweat and tears this project got out of him. It was made especially challenging since they built the new facility where the old one used to be, which forced them to operate out of tractor trailers and tents.

"And then you're still expected to deliver the standards even though you're working like a bunch of gypsies," says Shaffer. "It took a lot of planning to figure out where, for example, the portable gas tanks and toilet facilities would go. And none of the other course maintenance activities we do stopped. You could probably build a golf course and get 15 change orders, but it would be darn tough to build a maintenance facility and have 15 or less."

The fill station, chemical storage room and fertilizer building are all self-contained. Shaffer says they ideally would have liked to have put their chemical and fertilizer facilities in a stand-alone building separate from the rest of the maintenance facility so that, in case they ever caught fire, they could burn down without taking everything else with them. But they didn't have the space. That's why courses can't cookie-cutter maintenance facility projects with one ideal design template.

"It depends on your site," says Shaffer. "Gosselin and Christian had lots of space, which makes it easier."

It's all predicated on your budget, Shaffer says, adding that it's best to back into the project.

"If the club says you have \$2.2 million, then you know what you will do and what you won't do," he says.

Even though the chemical and fertilizer facilities are not stand-alone, Shaffer says he's not worried about any catastrophes.

"We haven't had a leak yet, but it's con-

7 tips to maximum chemical storage safety

1. Have a containment area where the chemicals are stored, a curb of concrete around the base of the room or building. A water tight seal should be incorporated in the concrete placement at all concrete control, expansion and construction joints. After concrete cures a concrete sealer and elastomeric joint filler should be applied.
2. Install a controlled temperature system and adequate ventilation system.
3. Build away from the main drainage of water and surface water. A good plan is to have the chemical storage and mix/load building separate from any other structure by at least 200 feet.
4. The most desirable construction materials for walls are Consider concrete masonry units and placed concrete for wall construction materials.
5. A floor sump system should be considered to retain, reuse or dispose of chemical rinsates and unintended releases in storage areas.
6. Store dry and liquids away from each other in separate rooms. Within these rooms, herbicides, insecticides and fungicides should be segregated as well.
7. Be sure your shelving is made of non-absorbing material.

tained the whole way around and all floors slope into the building," he says. "Even if we have a fire and the fire suppression system goes off, quite a bit of water can be contained in that building before it would get loose."

Shaffer and his team have always been "fastidious" about safety and cited 291 days without a lost-time accident for any of their employees. They have a safety officer on staff and 12 licensed spray applicators.

Everyone has to move up the ranks. In fact, all current supervisors were spray techs first. Any time there is mixing going on in the two 350-gallon tanks, there is an immediate supervisor making sure all protocols are being followed and everyone is wearing the proper safety gear. Spray teams are rotated so they don't burn out and start taking shortcuts.

"I'm sure our system isn't perfect, but we're probably 90 percent there," says Shaffer.

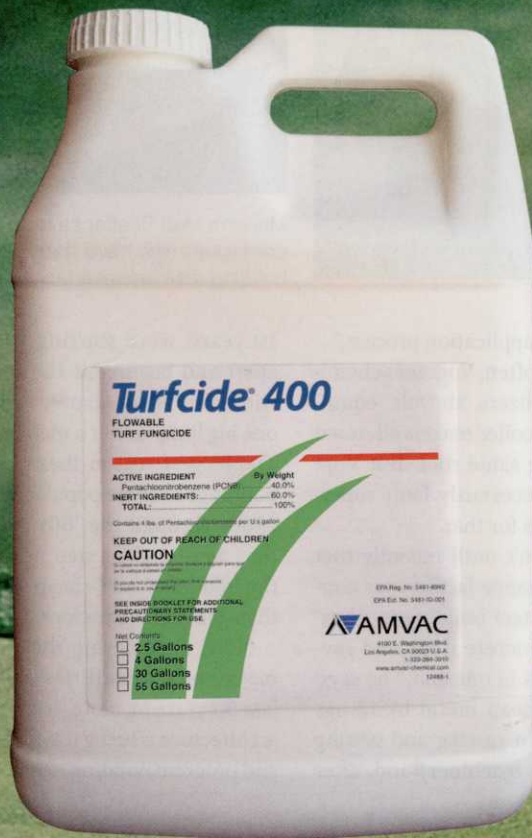
The entire new facility is self-contained. All the drains run into a central sump, and everything that flows into the sump gets neutralized before being pumped out onto the driving range.

"Any water that gets cut loose in there goes right into the floor drains, which have a pumping system, and then gets pumped into a big holding tank," Shaffer says.

The fertilizer building has a "high air exchange," where all air is exchanged every 10 minutes via high-volume, low-voltage pumps.

"You can walk in there in the dead of winter when the doors haven't been opened in three weeks and you can't smell any fertilizer," says Shaffer. "Also, you can run a forklift right into

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Marion's Matt Shaffer says superintendents need to lean on colleagues who have "been there done that" when it comes to building maintenance facilities.

our chemical room, which is nice for off loading product. And everything is behind closed doors."

It seems like common sense to segregate chemical storage away from the rest of a golf course's operations, but this is rarely seen in the field, says Mike Vogt, consultant with the McMahon Group.

"By storing all things related to chemical application in a separate area, it's much safer," says Vogt. "Plus, the superintendent is in a position to be able to control all of the moving parts of the

chemical application process."

All too often, Vogt sees chemicals, fertilizers, shovels, equipment and coffee makers all stored under the same roof. But Vogt doesn't necessarily fault superintendents for that.

"It wasn't until recently that a maintenance facility was considered a steel 'building-in-a-box' with a concrete floor and several rooms in one end," he says. "These cheap metal buildings soon began rusting and getting dented by machinery and, after

10 years, were starting to fall apart and busting at the seams with every maintenance item in one big lump under a metal roof. The biggest reason these metal buildings become popular in the 1960s through the '80s is that they were a giant step up from the 'old barn' and cheap at less than \$15 per square foot."

Now, considering that most maintenance facilities should last 50 years or more, industrial architecture is being used to plan and program buildings to specifi-

cally fit the needs of golf course maintenance. No longer are steel buildings being configured to "make do" for a cheap maintenance facility.

Vogt believes one of the best new developments concerning chemical storage safety is chemical manufacturers selling their products in large format packages.

"This packaging makes it easy to safely store large quantities of product," Vogt says. "The empties are easily recycled, and 10-gallon quantities are slightly cheaper than small format packages."

Shaffer re-emphasized the need for superintendents to lean on colleagues who have "been there done that" when it comes to building maintenance facilities.

"They can tell you if your containment area is too small, this is how big your chemical room should be, if you're going to fudge do it here not there, this is the footprint you need to park your sprayers, etc.," he says. "People who have built these before have a multitude of information that can help you." **GCI**

Jason Stahl is a Cleveland-based freelance writer and frequent GCI contributor.

Chemical storage best management practices

Store liquids away from dry chemicals. If that's not possible, store liquids below dry chemicals.

Have some type of containment. Even cheap plastic bins can be used to store chemicals on the shelves.

Make every effort to keep chemical packages dry and in their original containers with a legible label.

Look for old chemicals and get rid of them. "I can't tell you how many superintendents have old chemicals stashed in the dark corners of the building," says consultant Mike Vogt. "Many municipalities have programs to dispose of these products."

Get rid of wood shelves. The wood can become contaminated with chemicals over time; toxic waste.

Be vigilant. Keep chemicals locked when not using the specific storage area.

Breath free. Have a ventilation system in chemical storage areas.

Prepare for the worst. Have an emergency plan in place in case of fire, flood or uncontrolled release of chemicals – and be sure to educate all employees on that plan.

Documentation. Keep a separate file or a three-ring binder of labels that you have used in a separate place for reference.

Safety. Keep personal protection devices (goggles, safety glasses, respirators, dust masks, gloves, face shields, ear protection, etc.) away from chemical storage areas.