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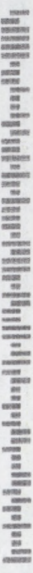
ON COURSE

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06 WHAT IS NEXT?

Robotic mowers and range pickers may one day be part of your equipment fleet, but will you manage them like employees?

Scott Verdun



18 BATTERY OPERATED LANDSCAPE TOOLS

Battery operated tools have made many tasks so much easier. As they continue to improve, 2-cycle fuel powered tools will be phased out of your operations.

05 Director's Column

11 Bull Sheet

22 MAGCS in Motion

COVER

This picture was taken by Mike Bavier, CGCS Retired when he visited the Ness Golf Club in Iceland. They've adopted the use of robotic mowers for their roughs.

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ON COURSE

The official publication of the Midwest Association of Golf Course Superintendents
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MAGCS MISSION

Midwest Association of Golf Course Superintendents (MAGCS) exists to promote professionalism and integrity, to provide networking, education and career enhancement opportunities to all members who facilitate the growth and enjoyment of golf.

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IT'S EASY TO GET MAD

Luke Cella, MAGCS

One of the recent topics that we discussed at our weekly Midwest MeetUps was why golf course superintendents and members of their staffs get upset when something breaks or fails in the line of use. The conversation began about how some (many) golf course mechanics get upset when an employee will bring a piece of equipment in that is broken and in need of repair. One superintendent told a story about how a mechanic (not employed there anymore) used to take such an affront, other staff members would never tell him when things were broken, they'd just try and hide or disguise the malfunctioning piece of equipment. For some superintendents this can be similar to other aspects of the golf operation like when golfers don't fix pitch marks, replace divots, rake bunkers, or smash or pond golf cars. While some will

NOT EVERYONE WIPES THEIR FEET WHEN THEY WALK INSIDE A BUILDING. NOT EVERY GOLFER REPLACES THEIR DIVOTS OR REPAIRS THEIR PITCH MARKS. IT'S JUST THAT WAY.

mildly joke that this is job security, others seriously take offense that something has broken in the line of use. I'm not talking about vandalism, or willful intent to break, destruct or damage but just when things go awry and fail. Why do we sometimes get so upset or take it as a personal affront when things fail?

Those who work in the golf industry associate themselves very readily with their facility. It's very common to hear the phrases "my club" or "my course". This association is very strong and most have this relationship with their golf course. Maybe it is because our roots are tied to agriculture and being so close to nature, knowing the ins and outs of a property, the time spent on the grounds, or understanding so much more than those who just travel "on top". Not only can you

properly name the things that grow there, but you know their plant classification, the growing environment they require. You know how they grow and what they need to grow and you provide those things to keep them healthy. You know how water travels through the property after a heavy rainfall and where the wind is steadied in protected corners. You know every bump and hill, every break and slope. You're the best golf partner to have as my wayward shots are never lost, you always know just where to look and which way a putt will break. There's a much deeper connection to the place that you manage, so it's understandable when something happens to it that you take it personally.

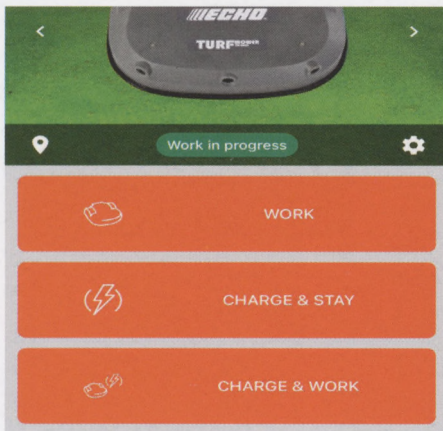
Any person that has more than a season or two at the helm of a golf course has encountered some type of damage from nature, maybe a wind storm, ice damage, flood, drought, disease, heat, etc. Just looking at this list, there's enough that goes wrong naturally to take care of "that's just job security" issue. When humans and their wayward ways damage the course or are using a piece of equipment when it fails, maybe there is finally someone to blame. We all know that golfers will take divots, golf shots will make marks on putting surfaces, walkways will get compacted, and golf cars will crash, and equipment will fail. Maybe in dealing with these maladies, it's good to understand the relationship between you and your club/course. Most don't own or have a share in the golf course but there is a strong sense of ownership. It is not in the possession vein, where one holds the deed or title, but ownership in the sense of control and care. This is the factor that drives you to make things better each day. When you pair this with your connection to the physical grounds, it is easy to take personal affront when things go awry. What is hard is to know that it is not.



Luke Cella, CGCS

WHAT IS NEXT?

Scott Verdun, Echo Robotics



Meet ESBP000136, your new driving range picker and mower. It has three simple commands: work, charge and stay, or charge and work. By the way, it never oversleeps, calls in sick or needs to take a lunch break.

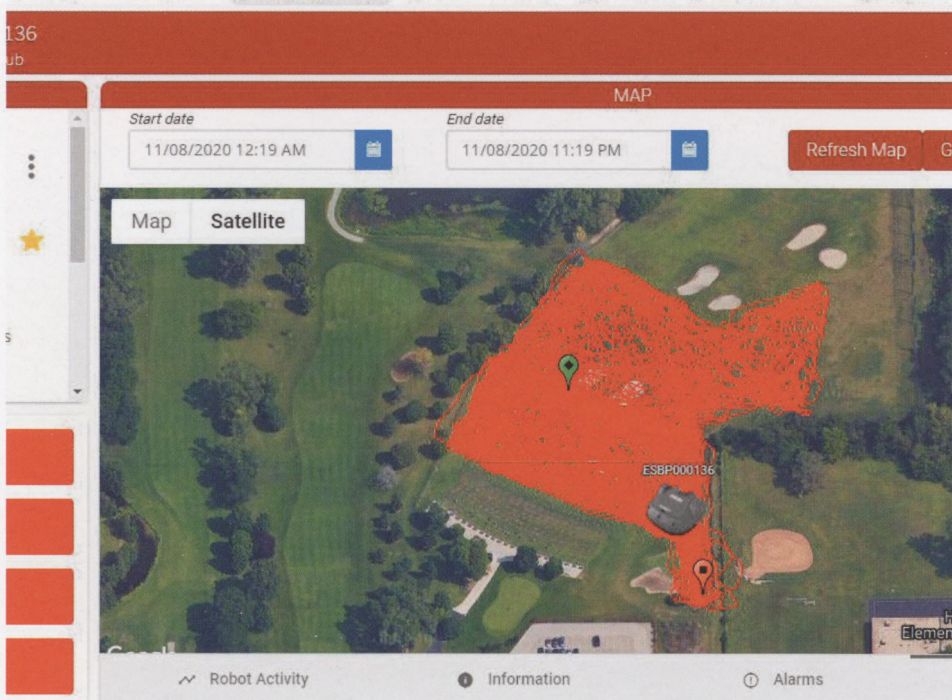
I have noticed recently whether while making customer calls or attending an industry function that I no longer belong to the younger demographic. This has been happening for a few years if I'm being honest and at this point, I likely have more in common with those who spend the winter in Florida than those looking for their first big career move; this isn't a knock to those who winter in Florida, I spend a week there with my parents every winter and it's fantastic! After 20 years in any industry, I assume it's common that as one makes the transition to one of the more experienced of a group the likely next step is to look back and reminisce about what has changed. While access to quality labor may be the biggest change in the past 20 years I'm going to focus on technology, some of which can likely alleviate some of the stresses caused by the labor market.

Looking back over the first half of my career, it can be remarkable how

much the use of technology has grown in the turf industry. When I first got out of college a cell phone ONLY made phone calls and not everyone had one. They also had real buttons, no data use ability, and if you wanted a picture you needed a real camera, although digital had mostly overtaken film by then. Now the list of uses for a modern smart phone is virtually endless; program irrigation, monitor weather, adjust your digital job board, correspond with anyone via dozens of different outlets, perhaps even tell your mowers to go to work.

Twenty years ago you were likely using a pocket knife or soil probe to test moisture content; now digital, Bluetooth connected moisture meters give volumetric moisture content and can create a map of dry or wet zones. Similar is the use of firmness meters in creating a surface that accepts an approach shot consistently across each putting surface. The ability to communicate has advanced tremendously from the printed newsletter to where most are at

You can track your new employee through an app on your phone/tablet or computer and see all the work that has been accomplished and what they're up to at any moment.



the very least using Email to using text blasts or social media to instantaneously communicate to their clientele. This list can go on forever to include a plethora of items and I'm sure you all have your own items to add. So, what's next?

I think it's safe to assume that environment, safety, and filling the labor gap will be at the forefront of a lot of product development. Autonomous equipment checks all of those boxes. In the early 2000's at a Midwest Turf Clinic, it was predicted that in the not-too-distant future we would be programming our mower fleet to operate in the way we program irrigation. While we aren't quite there yet in North America, it has begun in Europe where autonomous mowing has been adopted on a much greater scale. So where does that leave us in North America? It leaves us 5-10 years behind Europe where autonomy here consists mostly of smaller units that can maintain a specified area, defined by a buried wire. These units require limited supervision, no fossil fuels, and

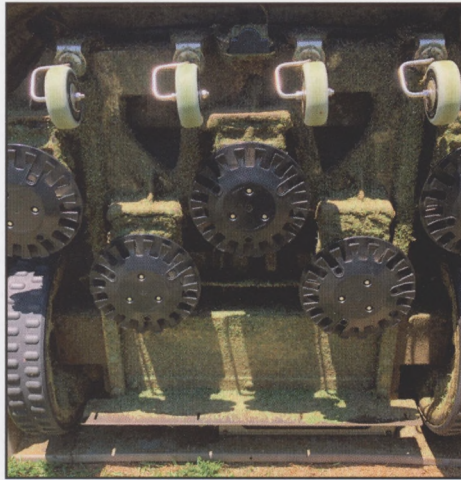
virtually no noise pollution.

So, how does it work? Think Roomba for the grass (or to pick the range), however, instead of bouncing off the walls these units bounce off an Electro Magnetic (EM) signal transmitted via a buried wire two to three inches below the surface. Wires are placed to establish a boundary and after some programming and scheduling specific to each location a robot will safely and without human intervention go to work. Just like an employee these units are not perfect, they can get stuck on a mound of mulch and a hard enough bump in the ground could trigger a safety sensor; occasional supervision is required but can be done remotely via computer or an app on your phone. Much like current equipment, periodic inspection is recommended to check on blades, wheels or for basic cleaning.

Robots are able to work night and day, charge when necessary and in the case of a range picker it will dump the



hopper of golf balls when full. In regards to driving range management and safety, a plastic covered robot is a much better target than a person protected by a net and in terms of mowing the range the robot won't damage a golf ball if hypothetically a few got missed while being "clean picked" on Sunday evenings. The robot can eliminate the need to use labor to mow the range as well as alleviate a potential stress point between two key heads of their departments.



Mechanically robots are pretty simple and have a limited number of components when compared to traditional equipment. To start there is a computer which is where all initial set-up occurs. The robot is programmed to know which electro-magnetic channel is associated with each working zone, from here a strong signal can also be confirmed and adjusted if necessary. Other parameters are defined like height of cut, docking with the charger, and the scheduling of when to work.

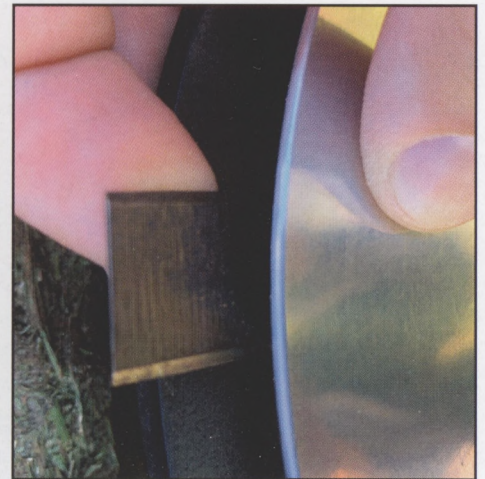
All units are powered by two electric drive motors, one on each of the rear drive wheels, and balance is provided by 4 caster wheels on the front of the unit. In addition, the range picker has an electric actuator which raises and lowers the hopper to dump the golf balls when full. The mower is equipped with either 3 or 5 cutting units depending on the size of the mower. Each cutting unit consists of 3 razor blades which operate with centrifugal force similar to a hover mower only smaller. There are also sonars, sensors across the front bumper, and lift sensors in each corner to ensure safe operation.

So, where is this going in the future?

Research and new technology are ongoing and while a fleet of autonomous fairway mowers is likely on the horizon, the next great advancements will likely be in efficiency. Random patterns will be replaced by back and forth or circle patterns. This will lead to opening up a greater total area covered while still utilizing the same amount of energy. As batteries become lighter and more efficient, mowers will be able to cover greater areas on less charges. Another addition will be the ability to set geo



zones where higher concentration of golf balls will need to be picked more frequently or only pick balls on the target greens. This is likely where the next advancements in autonomous operations will be, but as you know technology moves fast. Will you see a neighborhood golf course with a fleet of autonomous fairways mowers in 2021? Not likely, but it will be here soon and it will be a game changer for those willing to take the plunge. **ON COURSE**



The left picture is the bottom of the mower deck with standard cutting heads installed. The middle has golf ball protection discs installed. The right picture is a close up of a cutting blade.



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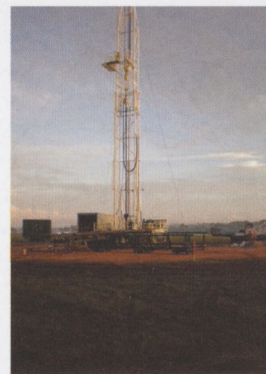
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CALENDAR OF EVENTS

Important Dates to Remember

January 13, 2021 - MAGCS Online Education - Wetting Agents

February 2-4, 2021 – GIS Virtual 2021 at any location you choose.

February 17, 2021 – ITF's Turf Conference at any location you choose.

March 1, 2020 – Deadline for Class A and CGCS Points submission through GCSAA.

THE BULL

John Gurke, CGCS

Happy New Year, and if it isn't better than the last one, we're all in a heap of trouble.

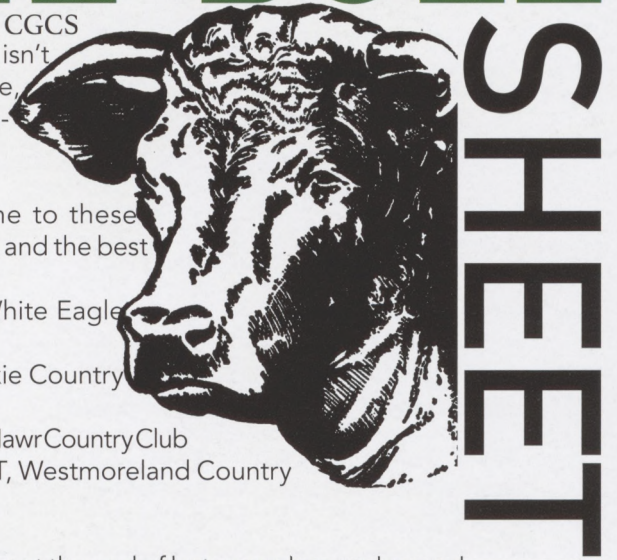
A warm January welcome to these newest MAGCS members, and the best of fortune to them:

Alec Gonzalez, Class C, White Eagle Golf Club

Bobby Key, Class DT, Skokie Country Club

Jon Muchow, Class C, Bryn Mawr Country Club

Tristan Norwood, Class DT, Westmoreland Country Club



We received some sad news at the end of last year when we learned



that Len "Lenny" Berg had passed away. Lenny was a longtime MAGCS member and Past President in 1981, and worked at several local facilities including the Village Greens of Woodridge, Cress Creek Country Club and the City of Chicago courses, along with a stint as our Lesco sales rep. Len's career path also took him to locales across the country, from New Jersey to New Mexico with a few stops in between. Lenny had been suffering from late onset epilepsy, and then developed CIPD, a disease that attacks the membranes surrounding the nerves. Please keep

Len his wife Pat and their son Jeff and daughter Christy in your thoughts and prayers.

Congratulations to **Keith Kirsch**, formerly at Wilmette Golf Club who is the new golf course superintendent at Klein Creek Golf Club in Winfield, IL.

Billy Casper Golf has changed its name to Indigo Golf Partners. The change was made to represent a new, modern brand aligned with golf's evolving landscape and the company's leadership in golf ownership and operations.

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DUES RENEWAL

The Midwest has sent out dues renewal statements for 2021. Please keep an eye out for them. Renewals can be processed online or by sending payment to our administrative office at Midwest Golf House. - While renewing, take a look over your contact information and make sure it is correct.

If you are wondering about your options for Illinois Pesticide Applicator/Operator Training and Testing for the coming year, you have a place to go. <http://pesticidesafety.illinois.edu> has all the latest on the new testing options, including online training courses and proctored exams. Available currently are these categories pertinent to golf: General Standards, Plant Management, and Private Applicator, with Turfgrass and Ornamentals coming available mid-January and Aquatics and Mosquito available in February. The training courses carry a fee of \$25-\$45 and the testing is \$12. In-person testing became available January 1st with obvious restrictions and rules. If you were used to getting your testing done either in DeKalb or Springfield, these options are no longer available.

Since there are no in-person MAGCS meetings planned in the near future, if you haven't heard, there are weekly Zoom meetings scheduled for Wednesdays at



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8:00 AM and featuring a different topic each meeting. If you are not receiving reminder emails on Tuesdays with login information, give **Luke Cella** a call or shoot him an email at luke@magcs.org.

The PGA Tour announced last month that Medinah Country Club's Course #3 will play host to the 16th Presidents Cup in 2026. This will add another notch in Course #3's bedpost, having the 2019 BMW Championship, 2012 Ryder Cup, two PGA Championships, three U.S. Opens, the 1988 U.S. Senior Open and three Western Opens as former conquests.

OK, why not? If you boil a funny bone, it becomes a laughing stock. Now that's humerus.

MAGCS dogs rule 2021! In what can only be described as a Sausage-fest, two of our members' dogs are gracing the covers of two very prominent calendars this year, and both are wiener dogs! The Dog Days of Golf calendar, sponsored by GCSAA and Lebanon Turf features



Rocket, Virgil Range's super model

Mulligan, Craig Watson's dapple miniature dachshund who patrols the grounds at Morris Country Club; and Golfdom's Underdog 2021 calendar, sponsored by Rain Bird and John Deere Golf is graced by Rocket on its cover, the jackshund (Jack Russell terrier/dachshund mix) owned by Kishwaukee Country Club's **Virgil Range**. Let's give a shout-out to the little fellows!

Although Covid-19 caused the cancellation of last season's John Deere Classic in Silvis, IL, it didn't stop the tournament's charity juggernaut which continued rolling as it has been since 1971, to the tune of \$12.22 million in

2020! 465 deserving charities benefited from this fourth largest amount raised since the tournament's onset, 98% of which has been raised since Deere assumed title sponsorship in 1998. This \$12.22 million total works out to \$32.58 for each of the Quad Cities' 375,000 residents, making the John Deere Classic No. 1 in per capita charitable contributions on the PGA Tour, a distinction it has held for over a decade.

Q: What happens when **Justin Kirtland** gives his assistant a weekend off?
A: **Al Hill** breaks loose.



Mulligan, Craig Watson's calendar cover pup.

Starting its second 100 years off with a bang, the USGA has embarked on a new collaborative body of work to address the economic and environmental viability of golf courses and improve the golfer experience—elements critical to golf's future. Over time, the work will mature into industry-wide recommen-

dations and best management practices designed to serve and benefit golf courses and golfers. Outcomes of this work will be released throughout 2021. Other collaborating entities include ASGCA, GCBAA, GCSAA, LPGA, NGCOA, and the PGA.

On February 17th, the Illinois Turfgrass Foundation and title sponsor Reinders will present the Virtual Turf Conference 2021 via Zoom. The half-day-long educational event will feature a Golf Track with golf-specific sessions, along with Lawn Care, Sports Turf, General Turf and Sod Growers tracks. The event will wind up at 11:15 AM with a keynote address from Dr. Karl Danneberger of the Ohio State University (they like to say "The" before their name) on Covid-19 and the Future of the Turfgrass Industry. For more info visit www.iturf.org.

Golf Witticism of the Month (from former PGA Tour player George Archer): If it wasn't for golf, I'd probably be a caddie today."

The November issue of Chicago District Golfer—the official publication of the CDGA—ran an article in its Around the CDGA section called Superintendent Spotlight, in which Knollwood Club's **Drew Barnett** was featured. Arriving at Knollwood from the Philadelphia Cricket Club in 2014, Drew has overseen the club's hosting of the 2016 Western Amateur followed immediately by a greens regrassing, among countless other challenges. **ON COURSE**



No words needed: Big Brian and his Big Twin.

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BATTERY OPERATED LANDSCAPE TOOLS

Luke Cella, MAGCS



It seems every time I head to one of the big box hardware stores there is some new battery powered hand tool on the market. Many golf course operations already use a few of the battery-operated tools; reciprocating saws are a favorite for irrigation repair, equipment techs love their impact and grease guns, and it would be tough to find an operation without at least one cordless drill/driver. Other seemingly handy tools for general maintenance include: soldering guns, circular saws, and grinders.

When asked recently, very few operations have gone the route of battery operated "outdoor landscape" tools. At most, there were a couple of facilities that have employed the use of cordless blowers for specific areas like around the clubhouse or a specific putting green for players to use when adjacent trees are littering the surface. Our industry is



still tied to the gas operated versions of these tools.

It was only a couple of years ago that there were still many tools that professionals would only get the corded version because the battery-operated ones either did not exist or were just not strong enough. But with battery technology, electronic controls and the widespread use of brushless motors today's battery-operated equipment is actually

It would be tough to find a golf course that doesn't already utilize a few battery operated tools. The reciprocating saw saves time and many sore muscles during irrigation work.

more powerful than its gas operated sister-in-law.

Battery operated equipment on the golf course is nothing new. Most superintendents employ the use of an electric cart as their primary mode of transport, allowing them to move around the course quietly and unobtrusively. However we're still at a point where only a few have taken the plunge to switch over their small power operated tools like line trimmers, blowers, hedge trimmers, chainsaws, and push-mowers. It

will take some time to adopt and accept in our industry.

In other markets where corded tools were king, one piece of corded equipment professionals have been slow to give up are handheld mixers for drywall compound/thinset also known as mud mixers. These are tools that are run continuously for 10-15 minutes under load. They evolved from a large drill with low torque that could handle this daily abuse. Engineers have developed new battery-operated mixers that have over sized gearing to produce torque and a motor that can not only turn it for long periods of time, but sense when higher torque is needed. These new mixers are so strong that ice fishermen are using them to replace their gas operated ice augers so they don't have to bother with fuels and trying to start them in the cold temperatures.

Engineers have been hard at work



designing landscape tools using this same technology to create units that are, stronger, quieter, more efficient, better balanced, with no fumes. Many suppliers tout that a unit, such as a line trimmer, will use one battery charge for one tank of gasoline/fuel mix. For those days when staff is married to a line trimmer some offer back-pack worn batteries that will allow run times up to ten hours.

The advancement of the battery plays a role in all of this technology and will continue to do so as that market continues to grow. There will always be a need for batteries that are smaller, cheaper to manufacture, faster to charge, more environmentally friendly, more energy dense, and sourced from readily available materials. Since this market already exists, is highly lucrative, and has positive environmental benefits, vast amounts of research continues to move forward in battery innovation.

From small start-ups to governments there are many players in this market searching for the next technology to be the next best thing. At present, the lithium-ion market is valued at \$60B and in terms of technology age, the lithium-ion battery is old and has not advanced in decades. Only the current limitations of lithium-ion batteries have been expanded by more efficient micro-chips and operating systems that efficiently use power. Most of us still charge phones each night but have noticed a less consumption and faster charge times in recent years. There is a lot of information on battery technology and way beyond the scope of this article. Know this, the world needs more power and a place to store it, some type of battery will do this.

There is one more key piece of technology that has aided the development of cordless tools keeping up and in some ways surpassing their corded counterparts and that is the brushless motor. Though they've been around for a while, manufacturers have only in the last decade put them in their power operated hand tools. (Makita was the first in 2009 to do so in a three speed impact driver). Their advantages are: Less maintenance, operates effectively at all speeds with rated load, high efficiency and high output power to size ratio, reduced size with far superior thermal characteristics, higher speed range and lower electric noise generation.

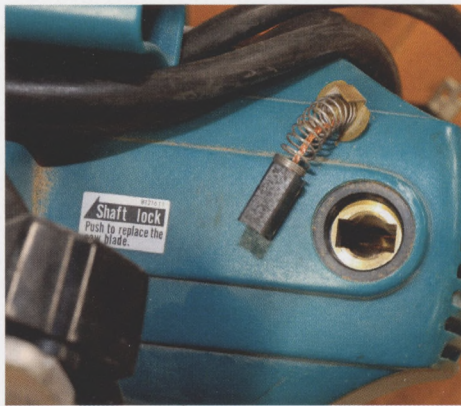
The net gain is a tool with greater efficiency (about 50-60% more when coupled with latest generations of Li-ion batteries), more durable motors (less maintenance), smaller and lighter (2-3x lighter), quieter with less vibration. Brushed motors still have their place being cheaper to make, can be rebuilt when needed, utilize a simple and inexpensive controller, they work well at fixed speeds and are ideal for really extreme operating environments. The path is clear though with hand battery-operated equipment, brushless is the option most manufacturers are using in their product line-ups.

The mainstream manufacturers (Echo, Husqvarna, Stihl, Toro) of hand operated landscape power equipment offer battery operated versions. There are a few electric only manufacturers (EGO, Greenworks Tools) available to the industry. offer some landscape tools as well. The tool only costs are

It would be a major investment for a golf course to replace every single line trimmer, backpack blower, chainsaw and other small gas operated tools in one season. Most build these tool groups by adding a couple new units each year.

comparable to the gas operated equivalent but the upfront battery costs add more to the tool purchase. One way to think of this is that you're buying all the fuel you'd use over the course of 3-4 seasons for that unit when purchasing it. From the specifications listed, most of the batteries will handle 1500 or more charge cycles. So, if you charge the same battery once each day over the course of a year, it will last 4 years. That's a lot of two cycle fuel, not to mention the mixing and filling and potential for spills on turf. Don't even try to count the number of pulls on the starter cord or trips back into the shop when one won't start. If you're looking to jump into the battery-operated tool market, some of the construction tool industry manufacturers (Makita, Milwaukee, DeWalt) have limited lines of landscape tools and chances are you might already have their battery platform in your shop. Try out a blower or line trimmer, or hedge shear – you might be surprised how well they work.

ON COURSE



Below left is a brushed circular saw with a carbon brush removed. The red drill on the left is a brushed cordless, the one on the right is brushless, as powerful, lighter and smaller.



BRUSHED VS. BRUSHLESS MOTORS

A traditional brushed motor is made up of four basic parts: carbon brushes, a ring of magnets, an armature, and a commutator. The magnets and brushes are stationary, while the armature and commutator rotate together on the motor shaft within the magnets.

When the motor is energized, a charge travels from the battery, through the brushes, and into the commutator. (The brushes are spring-loaded to maintain physical contact with the commutator.) The commutator then passes the charge on to the armature, which is made up of copper windings (they look like bundles of copper wire). The windings are magnetized by the charge and push against the stationary ring of magnets that surround it, forcing the armature assembly to spin. The spin doesn't stop until the charge from the battery stops.

A brushless motor loses the brushes and the commutator. And the locations of the magnets and windings are reversed: The magnets are on the conventional motor shaft and the copper windings of the armature are fixed and surround the shaft. Instead of brushes and a commutator, a small circuit board coordinates the energy delivery to the windings.

Because the electronics communicate directly with the stationary windings, the tool adjusts according to the task—which is why the companies market these as “smarter” tools. For example, if you're using a brushless drill to drive screws into Styrofoam, it more readily senses the lack of resistance (compared with a brushed motor) and begins to pull only what little charge it needs from the battery. If the tool then starts putting 3-inch screws into mahogany, it will adjust accordingly and draw more current. By contrast, a brushed motor will always run as fast as it can while in use.

In addition, brushless motors can be more powerful overall. Because the copper windings are on the outside of the motor configuration, there is room to make them larger. Brushless motors also don't have the friction and voltage drop that brushes create by dragging against the spinning commutator. This physical contact results in a continuous energy loss during the operating process. (popularmechanics.com)

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Niblick

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Chesapeake



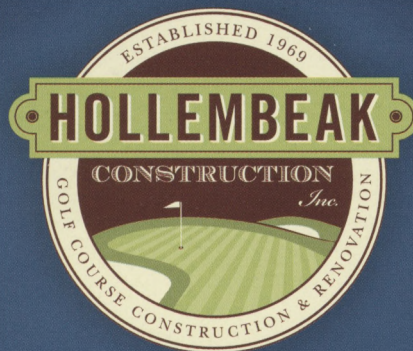
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NEW BOARD MEMBERS

MATT MCDONALD

First off, I would like to thank everyone for the opportunity to serve on the MAGCS board and I will do my best to serve the organization and the members. I was born and raised in Pittsburgh, PA and attended Penn State University. I made my way to the Chicago area after spending the first years of my career working at golf clubs in Pittsburgh. I have been the Assistant Superintendent at Midlothian CC and Naperville CC and for the last 5 years I have been the Superintendent at Water's Edge Golf Club in Worth, IL.

My life outside of work is spent with my wife Sarah and our dog Wyatt in Downers Grove. 2020 aside, we enjoy a night out for dinner with drinks and friends. We love traveling to new places for an adventure or going back home to Pennsylvania to see friends and family. I enjoy playing golf and even this time of year I will keep my game in shape (no comment on what shape that may be) at a golf dome or a simulator bay. Other times I keep myself busy by cooking something on my smoker, a little woodworking, or a home improvement project.

I decided to get involved with the MAGCS Board to give something back to the organization that has provided me with education, opportunities, events, and many friendships over the years. I hope to be able to help the organization continue grow and improve over the next few years. I am looking forward to a great 2021!



Matt, his wife Sarah and dog Wyatt on one of their trips.

CHARLIE LUKAN

Growing up in Byron, IL, my career in golf started at a young age. I have played since I was 4 years old with my dad at Prairie View Golf Course. I played on the golf team through high school and have never stopped. The love of the game is what pushed me to eventually become the Superintendent at Shepherd's Crook Golf Course. Prior to becoming a Superintendent, I received my degree at Kishwaukee College when I was able to land an internship at Evanston Golf Club. There I became the Assistant Superintendent and worked for 7 years. Ready to take on a new challenge with my partner in crime, black lab named Molly, we moved to Grayslake and I was hired on at Shepherd's Crook as the Superintendent in 2018. It has been a great new challenge on a fantastic golf course.

Outside of work, I try to travel as much as I can, scratching more states and countries off the list as I explore, ski or play new golf courses. Aside from traveling, I love getting together with friends while enjoying an IPA and rooting for the Dallas Cowboys (they suck I know). My fantasy football team is at least keeping my head high.

MAGCS has allowed me to meet a ton of new people, learn new things and see and play some new courses along the way. I hope that I can continue this and give back to the MAGCS community along the way. I'm excited for some new challenges and a great upcoming season.

ON COURSE



Charlie Lukan and his pup Molly.

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