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take on a punch card meant your program didn't work. I spent hours in the computing center trying to figure out mistakes on punch cards. That's why I never became a computer scientist."

After two semesters confounded by punch cards, Goatley switched to agriculture economics, but admitted he still had little direction. He didn't find his calling here, either, a fortunate event, it turns out, for his colleagues and students at MSU and Virginia Tech.

"I started to realize (ag econ) wasn't what I was called to do because in simulations of the stock market, I was the worst one in the class," Goatley said.

Finally, when filling out his schedule, his advisor suggested turf management.

Goatley agreed, and his Dad thought he was crazy. But he had finally found his calling, and Goatley knew it on the first day of class with A.J. Powell Jr., Ph.D. "I quickly became a convert," he said.

His first class as a turf management student ended up leaving a lasting effect on Goatley. Powell Jr. became one of Goatley's most admired and revered mentors who inspired him to go into academia.

In 1983, Goatley earned a degree in turf management but had only spent one year studying the field and had no pertinent experience. So, on Powell's recommendation, he stayed on to pursue a graduate degree.

Once that feat was accomplished in 1986, Goatley once again asked himself, "Now what?" And once again, it was Powell's encouragement that sent him to earn a doctorate at Virginia Tech University. Powell knew the faculty at Virginia Tech and helped Goatley secure an assistantship. He even asked a couple he knew from his own days spent as a student at Virginia Tech to put up an incoming doctoral student for a night or so until he could find a place to live.

The couple, Hillard and Irene Collier, invited Goatley to stay with them as long as he needed. He rented a basement room with a kitchenette from them for \$50 a month (including utilities) while he earned his doctorate degree. And he also happened to fall in love with the university and town and ultimately, his future wife, Lisa, who was from Blacksburg.

"It's one of the prettiest campuses with a certain type of limestone that's mined in this area," Goatley said. "I fell in love with the campus, which is in mountains of southwest Virginia. Dr. Powell said I should go here, and I thought, 'Well that sounds like the place for me.'"

At Virginia Tech, Goatley found another mentor whose style differed greatly from Powell's, but who had just as big an impact.

"(Professor Dick Schmidt) had a very dry science of humor, a good one," he said. "He was a great resource for me as a Ph.D. student. He trained me to become an independent thinker and to pursue ideas and research on my own. I knew early on in my Ph.D. program that I wanted to become an academic and do research and teach someday."

TEACHING MOMENT

With a doctorate as well as a fiancée in tow, Goatley next headed to Starkville to start his first real job at Mississippi State as a faculty member. Lisa initially balked at the thought of Mississippi, but it turned out to be a life-changing career stop.

"I went for the interview, and MSU turned out to be the absolutely perfect place for us as newlyweds and for me as a young faculty member," Goatley said. "The position was very heavily involved in teaching and research, and teaching was the primary focus. I really had very little training as far as formal teaching goes, but Dr. Powell and Dr. Schmidt had served as the models for the kind of teacher I hoped to be."

Cue the third mentor figure in Goatley's life—Jeff Krans, Ph.D., the professor at MSU who oversaw the school's turfgrass program, which was growing so rapidly they needed an additional faculty member to help.

"With Krans' direction, that program at MSU exploded to more than 100 undergraduate majors," Goatley said. "Jeff was the trendsetter that saw where a program needed to go before many others."

Krans also brought in Don Waddington, Ph.D., a retired professor from Penn State, to teach a special sports turf class for the students. "I suspect I learned more sitting in on Don's class than did our students," Goatley said.

During his 16 years at MSU, Goatley got married and started a family with his wife, taught hundreds of students as they pursued careers in turf, and first learned how he could give back to the community from a sports turf perspective.

Through a student project administered by Krans and his church, Goatley and the MSU turf club were called out to East Oktibbeha, a small county high school whose football field was in such poor condition, infested with fire ants, hard as a rock, and covered in weeds, that the team played its homecoming game on its opponent's field. The janitor at the school (where NFL great Jerry Rice played football as a youth) doubled as its field manager and used diesel fuel to create yardage and sidelines.

The turf club and Goatley put in many volunteer hours, got companies to donate chemicals and fertilizer and arranged for the team's logo to be painted in the center of the field (a touch that was never a consideration for the kids) as they worked to get the field back into shape for the beleaguered squad. On hand for the first game of the season on the spruced up field, "The students and I were as proud as the players," Goatley said. "The school was so appreciative."

A few weeks later when Goatley returned to the field to see how it was holding up, he was mortified to see more dead lines in the grass. The janitor assured him to not worry, that he was no longer using diesel fuel to mark the lines. "Instead, he told me that they had found a wonderful new product called Roundup that took its place," Goatley said. "I immediately realized to never take anything for granted."

In 2004, Goatley and his family got a chance to move back to their beloved Blacksburg, but it meant a change in pace. His job shifted from teaching and advising to serving as an extension specialist at Virginia Tech, a job that requires more travel as he conducts educational programming across the state.

"I take what my colleagues discover in their research programs and relay it to Virginia's turfgrass industry folks," Goatley said.

He still practices what he calls "old school extension."

"With digital media, and Twitter and Facebook, times have really changed in how information is delivered," he said. "I'm trying to adapt, but I'm not there yet. I really believe in shaking hands and meeting face-to-face. That's what's really neat about sports turf managers—how freely everyone shares their information. It doesn't matter what level you are, there are no egos."

While he's content in his current position, he admits there are days he misses being a teacher.

"The interaction I had teaching and advising was the part that I enjoyed the most," he said. "I wanted the respect of the kids, but for them to feel comfortable and learn a lot."

No one has to guess Goatley's effectiveness and success as an instructor; you can let the awards and accolades do the talking. Goatley received the MSU Undergraduate Advising Award in 2001, MSU College of Agricultural and Life Sciences Excellence in Teaching Award in 2002, and the National Academic Advising Association's Advising Award in 2002. In addition, he received STMA's William H. Daniels Founders Award in 2008 and the Virginia Tech Alumni Association's Excellence in Extension Award in 2011.

Goatley's background in academia is nearly unique to the post of

STMA President as he's only the second president in the group's history to come from the field.

It's a background that brings a fresh perspective to the job.

"People gravitate to Mike's easy nature and natural teaching ability," said Kim Heck, CEO of STMA. "His style is more coach and collaborator. He's not afraid to make difficult decisions...and being in academia he understands processes, which are very crucial to the operations of an association."

A leader from an academic world brings a tremendous amount of knowledge to the membership regarding turfgrass, agreed Troy Smith, outgoing STMA president.

"He is one of the brightest guys I know, and I hope our members will take the time to ask Mike some of their turfgrass questions as he will probably have the answer," Smith said. "Mike has also dealt with government bureaucracy and understands the need for great governance and standard operating procedures. I feel he will be able to lead our association in the right direction with our newly updated strategic plan."

WHAT'S IN STORE

Executing the association's strategic plan happens to be at the top of Goatley's agenda this year.

"We've got a great plan in place, and we're going to follow it," he said. "Our board is committed to growing our membership, increasing membership services, and continually improving sports turf manager recognition for all they do."

Two new committees are also listed among Goatley's priorities for 2012.

"Under Troy's leadership, we started an environmental committee and international committee, and those two areas remain on everybody's radar," he said.

Goatley holds high hopes for SAFE (Safer Athletic Fields for Everyone), the fundraising arm of STMA whose mission is to seek funds to support research, scholarship and association outreach efforts.

"We're going to champion that fields should be safe and sustainable at all levels, and urge leaders and the public to understand how important a role athletic fields play in building community pride and spirit," he said. "As an academic, I'd love to have a breakthrough. The SAFE board now has a plan and direction and focus. It's really promising to see how the group has re-engaged."

But Goatley places the biggest importance of all on serving members.

With regulations on the rise from agencies at local, state and federal levels, STMA members need a voice, and it's one Goatley wants to make sure STMA provides.

"Every day that passes, our members are facing more challenges," he said. "STMA has to be the resource for them and offer them the expertise and science-based approach when these challenges arise."

"The biggest (objective) of all is, how do we better serve our membership," he continued. "Promoting the value of being an STMA member so when it's time to renew, there's no questions asked."

No one can doubt Goatley's ability to take on the task. According to his predecessor, Smith, "Mike brings wisdom, logic and a true passion for our profession that will help him to be a successful president for STMA." ■

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Growing STMA provides education & professionalism

NEARLY 1,000 ATTENDEES enjoyed classic southern California sunshine during breaks at the Sports Turf Managers Association's 23rd Annual Conference and Exhibition last month in Long Beach. STMA reported sports turf managers, academics and other practitioners from all over the world were included in this audience. More than 1,600 folks participated in this year's event, nearly a 10% increase over last year's conference in Austin, TX.

STMA Headquarters staff, led by CEO Kim Heck, once again ran a smooth show and the Long Beach Convention Center and surrounding area was perfect for after-hours. Congratulations to Kristen Althouse, Patrick Allen, Leah Craig, Nora Dunnaway for a job well done.

First-time exhibitors Chad and Cathy Kropff of Bulldog Field Equipment, Roanoke, VA, were introducing their 4-way pitching rubber. They said traffic had been steady throughout

the exhibit hours. "Guys are ready to buy right now," Chad said.

John Klesk of Graco also was introducing a new product and reported heavy interest from buyers, and this correspondent had to wait until the show was officially closed to get in a word with Lindsay Merkt, whose g2 turf tools won STMA's Innovation Award for products introduced in 2011, because of booth traffic.

Attendees took advantage of nearly 90 hours

of sports turf specific education offered over 3 days. The industry's top professionals joined academics in presentations, and crowds enjoyed peer-to-peer networking events such as the Industry Segment Networking Sessions, Welcome Reception and Awards Banquet Reception at the 4-day event held at the Long Beach Convention Center and three nearby hotels.

CEO Kim Heck said Friday morning's session, Sportsturf 101 in Spanish, had seven participants and afterward the students, accompanied by translators, toured the trade show floor.

Selected educational sessions were video recorded and synchronized with PowerPoint presentations, the STMA said, in conjunction with Peach New Media. Twelve different presentations will be available, see www.stma.org/knowledge-center

HERE IS THE NEW BOARD OF DIRECTORS FOR STMA: Back row (l to r): Jeff Salmond, CSFM; James Graff; Rene Asprion; Debra Kneeshaw; David Pinsonneault, CSFM, CPRP; Mike Goatley, Ph.D.; Mike Tarantino, CSFM. Front row (l to r): Ron Hostick, CSFM; Jay Warnick, CSFM; Jeff Fowler; Martin Kaufman, CSFM. Not pictured: Troy Smith, CSFM; Allen Johnson, CSFM



KEYNOTES

Dr. Frank Rossi passionately stated his case that turf managers, whom he called “problem-solvers who care about the environment,” should embrace all three aspects of “sustainable resource management”: social, economic, and environmental. “We can meet the needs of today without compromising the needs of tomorrow,” he said.

“You can use the attraction of sports, the popularity of sports and impact players and fans. Your audience is there,” he added.

It was startling to hear Dr. Rossi say, “In 2008, for the first time in 25 years, people surveyed said they were willing to sacrifice environmental quality for economic reasons.” He was frank when he said, “Making decisions strictly for aesthetics must stop” referring to unnecessary use of resources.

Dr. Rossi urged the audience to know and understand the facts behind the cultural (social) benefits of turfgrass and its place in the ecosystem, as well as the true costs behind carbon emissions. He pointed to the increased populations in metro areas and how sports turf is increasingly being adapted to suit urbanized environments.

Former NFL player Eric Boles delivered an honest, high-energy message that focused on developing and cultivating leadership potential in yourself and those around you. “You only get better when you take chances,” he said. He said you have to be able to ask those around you, “On a scale of 1-10, how am I doing?” And no matter the answer, reply, “What would make it a 10?”

Boles recounted a story from high school when he and his jock buddies couldn’t understand why this average classmate kept dating the pretty girls. He said he was working on his game, like his friends, wondering why the girls weren’t noticing him. So he asked his classmate, “What are you doing to get dates with all these girls?” And the guy says, “I asked them.”

His point is maybe you have a great idea at work but you won’t share it with anyone because, well because of any number of reasons, fear of rejection or failure being chief among them. What’s the worst that can happen if you push the envelope a bit? Someone can say “no,” Boles said, “and that’s it.” YOU weren’t rejected, just your idea. Leaders keep trying to improve, he said.

NEW BOARD OF DIRECTORS

The new Board of Directors of STMA was installed in Long Beach. President Mike Goatley Jr., an extension agent and educator from Virginia Tech, gave a great acceptance speech, giving special praise to his family, Dr. A.J. Pow-

ell of his home state Kentucky, and Jeff Krans in his Mississippi State heyday. Mike’s board for 2012:

Immediate Past President: Troy Smith, CSFM

President-Elect: Martin K. Kaufman, CSFM

Secretary/Treasurer: David Pinsonneault, CSFM, CPRP

Vice-President Commercial: Rene Asprien

Professional Facilities: Allen Johnson, CSFM

Academic: Jeffrey Fowler

Parks & Recreation: Debra Kneeshaw

Higher Education: Jeffrey Salmond, CSFM

K-12: Michael Tarantino, CSFM

Commercial: James Graff

At Large: Jay Warnick, CSFM

At Large: Ron Hostick, CSFM

SAFE FOUNDATION

The Foundation for Safer Athletic Fields for Everyone (SAFE) used its 12th Annual Golf Tournament, played at Industry Hills Golf Club at Pacific Palms’ Eisenhower Course, a Casino Night at the Welcome Reception and the live auctions, raffles and other fundraising endeavors to make more than \$27,000 for the foundation.

Mike McDonald, CSFM, from the University of Minnesota made a hole-in-one at Industry Hills, canning his tee shot on the par 3, 130-yard 9th hole and winning a vacation for two while he was at it. Rick Peruzzi, CSFM, Mike DiDonato, CSFM, Kevin Meredith, CSFM, and Matt Tobin won the net-scamble format tournament.

The first-ever SAFE Casino Night at the Welcome Reception was a hit with attendees. More than 100 participants played blackjack, roulette and craps, vying for \$250 gift cards to Bass Pro Shops, Omaha Steaks and Best Buy. In typical STMA member fashion, attendees stepped up and ensured that the SAFE Auctions and Raffles brought in a record amount. Winners walked away with some great items including autographed memorabilia, apparel, a Toro Turf Guard System valued at \$7,800, electronics, hotel packages, golf gear, and sports turf specific equipment. The Toro Giving Program presented the SAFE Foundation with a donation of \$9,500 in honor of Dr. James Watson to support the SAFE Scholarship program.

SAFE Chairman Boyd Montgomery, CSFM, CSE of Toro launched a new grassroots campaign to engage the STMA membership, at the individual and corporate levels, over a 5-year period. Cultivating the development potential of the membership is the first step

Continued on page 42



» **POSING FOR THE PAPARAZZI** at the Welcome Reception and Casino Night in Long Beach. Mary Owen, front, with (l to r) Dr. Gil Landry, Dale Getz, CSFM, Mike Trigg, CSFM, and Rich Moffitt behind her.



» **CHRIS CALCATERRA**, CSFM, CPRP, left, presents the 2011 STMA President’s Award for Leadership to Vance Rzepka, representing the MO-KAN Chapter of STMA. Calcaterra was filling in for Troy Smith, CSFM, who was working the NFL playoffs.



» **L to R:** Los Angeles of Anaheim President Dennis Kuhl, Los Angeles of Anaheim Head Groundskeeper Barney Lopas, Orange High School senior shortstop Emmanuel Flores, and Orange High head baseball coach Alex Vicario. Photo credit: Deb Robinson. Lopas said, “I am pleased with the overall renovation of the Orange High School baseball field. Since May 2011, my (Los Angeles Angels of Anaheim) grounds crew worked really hard on this project to bring to fruition. We were grateful to have the support of our main sponsors, including the Baseball Tomorrow Fund, The Toro Company, Covermaster and Turface Athletics. Each year, all of the MLB Groundskeepers look forward to this community service project to assist a local group in need of support.”



>> **SUMMER SOFTBALL CAMP** at the University of Tennessee's Sherri Parker Lee Stadium. Photo taken at the 2011 STMA Regional Conference in Knoxville.

New herbicides for 2012

NEW HERBICIDES are continually being introduced into the marketplace. Many of these new herbicides may benefit sports field managers maintaining cool- and warm-season turfgrass athletic fields. The following information outlines several herbicides that entered the marketplace in 2011 as well as other materials that will be introduced in 2012.

Specticle (active ingredient is indaziflam) is a new preemergence herbicide from Bayer Environmental Sciences that was originally released for commercial sale in 2011. Specticle is labeled for use on warm-season turf at rates of 2.5 to 5 oz/A. This herbicide is not labeled for use on seashore paspalum (*Paspalum vaginatum*); thus, turfgrass managers with seashore paspalum athletic fields (or bermudagrass fields heavily infested with seashore paspalum) should select an alternative herbicide for preemergence weed control.

Research at the University of Tennessee has found that Specticle provides effective preemergence control of crabgrass (*Digitaria* spp.), annual bluegrass (*Poa annua*) and goosegrass (*Eleusine indica*) at lower use rates than traditional preemergence herbicides. Research conducted in 2011 at Tennessee illustrated that Specticle provides postemergence control of non-tillered smooth crabgrass similar to Dimension (active ingredient is dithiopyr). Data also suggest that Specticle provides postemergence control of non-tillered annual bluegrass as well.

Individuals should use caution when applying Specticle to athletic field turf. This herbicide has a longer residual than other preemergence herbi-

cides, which could be problematic in high wear areas. There are label restrictions pertaining to not only overseeding but establishing new warm-season turfgrass from stolons/sprigs or sod. Label restrictions also prevent turfgrass managers from overseeding with perennial ryegrass for 8 to 12 months after treatment with Specticle. Furthermore, the product label currently states that turfgrass managers must delay sprigging or sodding for 2 and 4 months after application, respectively (Anonymous, 2010).

Tribute Total is a new postemergence herbicide from Bayer Environmental Sciences that will be introduced for commercial sale in 2012. Tribute Total will be labeled for use in warm-season turfgrass only. Research at the University of Tennessee has found fall applications of Tribute Total to control dallisgrass (*Paspalum dilatatum*) similar to MSMA. Studies have also shown Tribute Total to be an effective option for yellow nutsedge (*Cyperus esculentus*) and Virginia buttonweed (*Diodia virginiana*) control, as well as annual bluegrass and overseeded perennial ryegrass.

Xonerate (active ingredient is amicarbazone) is a new postemergence herbicide from Arysta LifeSciences that will be introduced for commercial sale in 2012. Xonerate will be labeled for use on mature Kentucky bluegrass, perennial ryegrass (*Lolium perenne*), tall fescue, and bermudagrass (*Cynodon* spp.) among other cool- and warm-season species. Application rates for Kentucky bluegrass, perennial ryegrass, and tall fescue range from 2 to 4 oz/A, while this herbicide can be applied to bermudagrass at rates of 3 to 10 oz/A.

Research at Tennessee has found single applications of amicarbazone to effectively control several winter annual broadleaf weed species at 7.5 oz/A, along with sequential applications at rates greater than 5 oz/A. Tank mixtures of amicarbazone + prodiamine applied in spring have also been shown to provide postemergence control of winter annual weeds and preemergence control of smooth crabgrass.

Xonerate will be marketed for selective annual bluegrass control in labeled cool- and warm-season turf species. Effective control programs may require sequential applications. Sports field managers should apply Xonerate in the spring of the year after annual bluegrass has resumed active growth. Research data in Tennessee and Georgia suggest that fall applications should be avoided. Labeling also restricts Xonerate applications when daytime air temperatures are expected to exceed 85°F.

Studies at the University of Tennessee in 2011 illustrated that a single application of Xonerate plus Tenacity (active ingredient is mesotrione) controlled annual bluegrass similar to sequential applications of Tenacity alone. This concept will be researched in further detail in 2012.

Many of these herbicides will provide athletic field managers with new options for weed control in 2012. Always refer to the product label for specific information on proper use, tank-mixing compatibility and turfgrass tolerance.

Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the University of Tennessee's Institute of Agriculture. For more information on turfgrass weed control, visit the University of Tennessee's turfgrass weed science website at www.tennesseeturfgrassweeds.org. ■

References

Anonymous. 2010. Specticle 20 WSP herbicide label. Bayer Environmental Sciences. Research Triangle Park, NC. Available at: <http://www.backedbybayer.com>

Dr. Jim Brosnan is assistant professor, turfgrass weed science, and a co-director of the University of Tennessee's Center for Athletic Field Safety. Greg Breeden is weed science extension assistant at U of T in Knoxville.

JOHN MASCARO'S PHOTO QUIZ

John Mascaro is President of Turf-Tec International

Can you identify this sports turf problem?

Problem: Missing mower operator

Turfgrass area: Industrial complex

Location: Eastern United States

Grass Variety: Centipede grass

Answer to John Mascaro's Photo Quiz on Page 33



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Laser grading: setting your sights on quality

As the demand for quality and playability on sports fields continues to grow, so does the demand for laser grading. Laser grading is establishing surface elevations within a given area using an automated blade control system.

To understand a little more laser grading, you first have to understand a few terms and principles. A basic understanding of the types of lasers also helps.

Laser transmitters come in a number of configurations from simple to more complex. The basic principles are all the same. As a laser transmitter rotates, it sends out a beam of light over an area that is picked

up by a receiver. In the process of laser grading, the receiver is mounted on the grading equipment, attached to a mast or pole. The receiver picks up the signal from the transmitter and in turn sends the signal to a control box that simultaneously raises or lowers the grading blade to keep the cutting edge of the blade at a consistent elevation relative to the transmitter beam. Ultimately

the established grade will mirror the laser transmitter beam.

The four main types of lasers

are the level laser, single plane laser, dual plane laser and cone laser. The area of the laser beam emitted from the laser transmitter is called a plane. The plane is a two dimensional area. Picture a flat sheet of paper. Now picture that sheet of paper as being large enough to hover over the area to be graded. Maybe that's why it's called a plane? A plane has a Y axis and an X axis. The Y axis could be considered one edge of the paper and the X axis could be considered the edge perpendicular to the first.

**LASER
GRADING**

"This is an article I wish was available when I started using a laser."
—Jim Hermann, CSFM

The most basic laser is the level laser. This laser is typically used to document existing relative elevations within an area. This laser is designed to send out a flat “level” beam of light. That is, the X axis and the Y axis are both level creating a level plane above the area being documented.

Example: The laser transmitter is set up in a location within view of the area to be documented. The laser has to be set up in “plane” sight, pun intended. Anyway, the operator uses a grade rod marked off in feet and inches or other measurement such as tenths, meters etc. The grade rod is equipped with a laser receiver. The operator can document the relative elevation at any location within the proposed area. First, he or she positions the grade rod perfectly vertical on that location. Then, by maneuvering the receiver up or down on the grade rod to intersect with the beam sent by the laser transmitter, the operator can read the corresponding measurement on the grade rod; the higher the corresponding measurement, the lower the actual elevation. By documenting the relative elevations over a grid work of locations the operator can chart the surface contours or topography of a given area. Once the operator has done this, he or she can develop a better understanding of water movement and use this information to develop an effective grading plan.

EVERYTHING IS RELATIVE

It is important to note that when documenting relative elevations, these elevation readings are only relative to the height or elevation of the laser transmitter at that time. If the transmitter is repositioned, the operator will come up with totally different readings on the grade pole. To allow for this, a benchmark is established at the time the elevations are documented. A benchmark is a location within plane site of the transmitter that is a permanent elevation such as a concrete pad, footing, or possibly the base of a fencepost. By establishing a benchmark, the operator can reposition the transmitter on a day to day or even year to year basis as long as the elevation of the benchmark doesn't change. By documenting the new reading for the benchmark, the operator can translate the new readings to correlate with those documented in the past.

The benchmark is used as the reference elevation when positioning the receiver on the mast above the laser grading equipment. First the laser transmitter is positioned, turned on and programmed to the desired slope. The cutting edge of the grading blade directly below the receiver is positioned on the benchmark elevation. The receiver is raised or lowered on the mast to intersect with the laser beam. The receiver will remain in this position as long as the transmitter is not repositioned. Whenever the laser transmitter is repositioned, the laser receiver must also be repositioned to correlate with the elevation of the new transmitter location. The same process is carried out to position the receiver correctly when a grade rod is used.

A single plane laser has the ability to slope the Y axis while the X axis always remains level. This creates a flat plane but not a level plane. It is important to note that the terms “flat” and “level” are many times used interchangeably. In reality they can

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have totally different meanings.

The term “level” means that all points within a defined area are at the same elevation, such as the elevations of the water surface on a calm lake. Flat just means flat. A flat surface can extend uphill or downhill, side to side or both. I once made the mistake of saying that topdressing helps to level a soccer field. We all know a soccer field cannot be level. Smooth yes, flat yes, level no.

Many, if not all lasers have a sight, typically on the top of the laser. With it, you can sight along a straight line to establish the X axis. An example would be to set the transit up directly above the apex of home plate and site down a foul line to the foul pole. This line would typically be considered the X axis. With a single plane laser

this line (axis) would have to be level. If you want a certain slope perpendicular to the foul line such as toward the dugouts, you could adjust the Y axis to whatever percent slope you want.

Since the laser beam travels 360 degrees in a complete circle, you could mark the proposed elevation at the front of the dugout and also mark an elevation for the pitching area as long as the same slope is desired in both directions. If a different degree of slope is desired, you could readjust the Y axis in either direction. The downhill side of the axis is negative (-)Y and the uphill side of the axis is positive (+)Y.

The only difference between a single plane laser and a dual plane laser is that with a single plane laser, only the Y axis is

adjustable. With the dual plane laser, both the X axis and the Y axis are adjustable. So, in the example, if you want a 1% slope (downhill) from home plate to first base you can set the X axis at -1% and if you want a .75% slope (uphill) to the pitching area you can set the Y axis at +.75.

The cone laser creates a conical grade. This transmitter has the ability to bend the laser beam either up or down with the transmitter always being positioned at the center of the cone. A conical grade is used when an infield is graded from a central location between the bases out in all directions, typically

Laser grading is a combination of technology and operator ability. Never take for granted that because an infield is laser graded that it is graded effectively.

creating a grading plan with all the bases at the same relative elevation. With many cone lasers adjusting the X and Y axis can tilt the cone forward, backward, left or right. Adjustments like this may be necessary to match existing perimeter grades.

One very important fact to keep in mind is that regardless of how accurately the operator can grade an infield, it is still at the operator's discretion how to set up the laser and how to tie into the existing elevations surrounding the infield. **Laser grading is a combination of technology and operator ability.** Never take for granted that because an infield is laser graded that it is graded effectively.

Of these four types of lasers, due to their versatility, only the dual plane laser or the cone laser is normally used in combination with automated blade control equipment.

Typical laser grading equipment can either be a single mast or dual mast system. A single mast system is the least expensive and has a single receiver typically mounted in the center of the blade. The receiver controls the blade by either lifting the entire blade or lowering the entire blade.

A dual mast system is more expensive and has two receivers with one receiver