

Sports Turf Manager

for better, safer sports turf

Winter 2009

VOLUME 22, NUMBER 4

- 3 President's Message
- 4 Event Calendar
- 5 Blogging on Turf
- 6 OTS 2010 Sports Turf Sessions
- 7 STA Networks Internationally
- 8 Artificial Turf Dying in Big Leagues
- 11 Pros & Cons of Green Fuels
- 16 Options For Building Sports Fields
- 20 Why Classify?
- 22 Cover Story Continued



Making Ontario Accessible

BILL CLAUSEN, FACILITY MANAGER, UNIVERSITY OF GUELPH

The Government of Ontario has a plan to make the province accessible to all citizens by 2025. This process began with the Accessibility for Ontarians with Disabilities Act (AODA) in 2005. Accessibility Standards for Customer Service is the first standard to be created under the authority of the act. All public sector organizations must comply by January 1, 2010; non-profit organizations and the private sector must comply by January 1, 2012.

Over the next year, other standards will be introduced dealing with transportation, information and communications, the built environment, and employment. What does this mean to the turf industry and those of us who provide recreational services?

One, we must comply. Two, we must provide ongoing training to all our staff. Three, we must be prepared to make our facilities as accessible as possible. Four, when designing new facilities or renovating older facilities, we should design ahead of the curve and build facilities completely accessible.

Complying makes sense. All our fellow citizens deserve the opportunity to access, use and receive the level of customer service those without disabilities receive.

Training our staff to the level required to provide the level of service mandated by the Accessibility Standards for Customer Service will only improve the expertise of our staff and allow them the opportunity to provide exceptional service to all clients. While reviewing the material available on the Ministry of Community and Social Services website, it is clear the training material can be incorporated into our standard...→ **page 22**

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STA OFFICE HOURS

Lee Huether is in the office from 9:00 a.m. to 2:00 p.m. Tuesday through Friday. The office phone number is (519) 763-9431. At other times, a message may be left on the voice mail system. Please include the vital information of name, telephone number with area code, and time of calling. The office may be reached at any time by faxing (519) 766-1704 or via e-mail.

The President's Desk – Gord Dol

Winter has arrived. The time has finally come to sit back and reflect on the past season. A time to analyze what went well and what didn't go so well. For many of you, it is also budget preparation time, which I'm sure promises to be a daunting task given the current economic environment.

OTS is Just Around The Corner

The 2010 Ontario Turfgrass Symposium will be held February 17 & 18 in Rozanski Hall, University of Guelph. This year promises to be another great educational forum. The Sports Turf Association is proud to be a part of OTS, now in its 19th year.

On February 17, during the OTS, we also hold our annual general meeting, open to all members. At that time, we'll be electing new directors to the board. Now would be the time to consider allowing your name to stand for election. If this interests you, please speak to any board member or call Lee at our office. Deadline for nominations is December 18.



It has been a great honour being your president for the past few years. I urge you to consider joining the Sports Turf Association board. It's a great network of dedicated professionals and an idea sounding board.

New International Affiliation

I am very pleased to announce a recent agreement with the Sports Turf Managers Association (STMA). The STA is now recognized by the STMA as an International Affiliate Organization. This officially opens the door to share information and resources between both organizations. STMA will also offer STA members access to their annual conference, education and training courses at member rates. I would like to thank Paul Gillen and Bob Kennedy for their hard work pulling this together.

Term Coming to a Close

I have had the honour and privilege of being president of this great organization since the spring of 2006. Paul Gillen (our current VP) will be assuming the role

after the AGM. We have accomplished many tasks and I would like to take this opportunity to thank Lee and the boards of the last four years for their hard work and dedication. I will be moving into the past president's position and look forward to many more years of service to both the STA and the sports turf industry. ♦



We wish everyone a Merry Christmas and a healthy, prosperous New Year!



Aerial View of The Guelph Turfgrass Institute, Fall 2009

Industry Calendar of Events

December 18, 2009

EARLY BIRD REGISTRATION DEADLINE!
 Ontario Turfgrass Symposium
 See p. 6 for turf sessions ★
 Info: 519-767-5000
www.open.uoguelph.ca/ots

January 12-14

Landscape Ontario Congress
 Toronto, ON
 Info: 800-265-5656
www.locongress.com

January 12-16

Sports Turf Managers Association
 21st Annual Conference & Exhibition
 Orlando, Florida
 Info: www.stma.org/
www.sportsturfassociation.com

January 29 to February 3

Western Canada Turfgrass
 Association 47th Annual
 Conference & Show
 Nanaimo, BC
 Info: www.wctaturf.com

February 1-26

University of Guelph
 Turf Managers' Short Course
 Guelph, ON
 Info: 519-767-5000
<http://tmcs.open.uoguelph.ca>

February 12-28

The Vancouver 2010 Olympic Games
www.vancouver2010.com

February 17 & 18

Ontario Turfgrass Symposium
 The Culture of Green
 University of Guelph ★
 Guelph, ON
 Info: 519-767-5000
www.ots.open.uoguelph.ca

February 17

Sports Turf Association ★
 Annual General Meeting
 University of Guelph (at the OTS)
 Guelph, ON
 Info: 519-763-9431
www.sportsturfassociation.com

February 26 to March 2

43rd Annual Canadian International
 Turfgrass Conference and Trade Show
 Toronto, ON
www.golfsupers.com

March 12-21

The Vancouver 2010
 Paralympic Games
www.vancouver2010.com

May 3-6

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Turfgrass Student Bloggers "Link Up" at U of Guelph

Future leaders in the turf industry are practicing citizen journalism and making online connections with industry. The 30 diploma in turfgrass management students from the University of Guelph, class of 2011, are blogging about turf trends and expressing strong opinions concerning the industry.

about course renovations, the cosmetic pesticide ban and economic struggles in the turf industry.

"The blogs posted by the turfgrass students incorporate significant issues in the industry, says Rob Witherspoon, director of the associate diploma in turfgrass management. Adds communications

Join the discussion – or simply drop in to learn more! We've loaded the links of individual bloggers on our site, www.sportsturfassociation.com. **Also...** *Tweeting on turf: Linking social media with your business* will be presented at the 2010 Ontario Turfgrass Symposium. Visit www.ots.open.uoguelph.ca for all the details.

"Blogs and other internet-based communication is what golf course members are starting to expect from their superintendents," says student Matthew Eastman. "We're writing relevant stories and linking to turfgrass companies."

These students are tomorrow's golf course superintendents, lawn care specialists and sports field managers. Along with courses on soil, plant biology and equipment, they're taking communications and have started weekly blogs tackling turf issues. They're learning that blogging is an important tool in the turfgrass industry.

Every Thursday, class members take a field trip to a different destination in southern Ontario. They learn about problems, skills and new ideas about general turf maintenance. Some students have blogged



course co-instructor Owen Roberts: "The students are working hard to excel in effective communication techniques."

For more information, contact Rob Witherspoon, Program director, robwith@uoguelph.ca, 519-824-4120 (x 56886) or Owen Roberts, Communications instructor, owen@uoguelph.ca, 519-824-4120 (x 58278). ♦



Press Release

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The Benco TU-900 with its powerful 100 hp Kubota diesel engine and rugged chassis can be utilized year-round. From snow removal and salting in the winter to sweeping recreational facility parking lots in the spring, Benco is the perfect tool for these applications. Benco also offers a quick detach .64 cu. yd. front end loader with an awesome 3,500 lb lift capacity.

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For more information, contact Dick Raycroft, G.C. Duke Equipment Ltd., draycroft@gcduke.com, www.gcduke.com, Burlington, Ontario, 1-800-883-0761 (x116).

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SPORTS TURF RELATED SESSIONS

WEDNESDAY, FEBRUARY 17

9:00-9:45. W3 "Field of Dreams": Real Turf for BMO Field *Bob Hunter, Maple Leaf Sports and Entertainment.* After successfully sodding BMO Field for the Toronto FC vs. Real Madrid friendly, the decision was made by Toronto city council to install permanent natural turf at BMO Field. With a four party agreement in place between the City of Toronto, Maple Leaf Sports and Entertainment, and the provincial and federal governments, Bob Hunter will talk about the plans to have the turf ready for the Toronto FC home opener next season.

10:15-11:00. W4 If you sod it they will come: Sodding BMO Field for Real Madrid vs. Toronto Football Club Friendly *Claus Zander, Zander Sod.* When Toronto FC wanted Real Madrid to fly in for a "friendly" game, it had to be played on natural turf. They were given 40 hours to cover the artificial field with sod, no room for excuses, the teams were going to play. The turf had to be removed immediately following the match with the artificial field prepared and ready to play on again. This talk will document the process from start to finish.

1:30-2:30. W6 What are the true costs of the cosmetic pesticides ban for municipalities? *Mark Dykstra, City of Waterloo, Bill Slute, City of Oshawa, Andy Wickens, City of*

Mississauga. Parks Directors from municipalities that have had bans in place for several years will speak about what it costs to implement the cultural practices that are necessary to maintain quality sports fields without pesticides.

2:30-3:30. W7 Sports field speed and strength – Just the beginning..! *Dr. Tim Vanini, New Dimensions Turfgrass.* This talk discusses the establishment of Kentucky bluegrass, perennial ryegrass, *Poa supina*, and bermudagrass in 70 and 435 day windows. In these studies, establishment speed is not only evaluated, but also strength of the playing surface (traction, divoting resistance, sod strength, etc). In real life situations, traffic is applied at early stages of plant development and there is a need to identify grasses that withstand intense pressure. This information can aid sports field managers in making best decisions regarding species and cultivars.

THURSDAY, FEBRUARY 19

9:00-9:30. T1 Advances in fertilizer: Information on traditional, slow release, foliar and organic fertilizers *Dr. Eric Lyons, University of Guelph.* Proper plant nutrition is essential in maintaining healthy sports turf. New products are always coming to the market and this talk will focus on both new and old fertilizer technologies and how to integrate them to better achieve the goals of your fertility program.

9:30-10:30. T2 How to get a sports field ready in 70 days – from theory to practice *Dr. Tim Vanini, New Dimensions Turfgrass.* Little information exists for sports field managers on optimal ways to re-establish trafficked areas on a sports field during a 70-day, summer window. This research study looked at turfgrass cover percent ratings, traction, and peak deceleration. The best strategies from this study were applied to a high school scenario in the summer of 2008. The results of this scenario will be discussed at this session.

11:00-12:00. T3 What works best for building a sports field? In-house, architect bid-contractor, design/build or other? *Gord Dol, Dol Turf Restoration Ltd., Mario Pecchia, City of Toronto and Harry Kodoors, MMM Group.* This panel will discuss the pros and cons of the different avenues for sports field construction.

PLENARIES

- Overview of the cosmetic pesticide ban, Violet van Wassenae, MOE
- Making sense of new products, Dr. Eric Lyons, Univ. of Guelph
- Dealing with a critical injury/death at a sporting event, Terry Piche, ORFA
- Tweeting on turf: Linking social media with your business, Andrew Douglas, Univ. of Guelph, & Anne Douglas, Anne Douglas Communications

IMPORTANT REGISTRATION DETAILS

EARLY BIRD: DECEMBER 18, 2009

Discounts. As an STA member in good standing, you qualify for lower association rates. In addition, others from your facility/organization who are not STA members qualify for the lower association rates when registered with a member. Send the registration in the same envelope, fax it at the same time, or make just one phone call to register. Visit www.ots.open.uoguelph.ca for more details.

STA Recognized by STMA as First International Affiliate Organization

The Sports Turf Managers Association (STMA) announced recently that it is recognizing the Sports Turf Association (STA) as its first International Affiliate Organization. STA and STMA will collaborate and share information and educational resources.

To be an International Affiliate, the organization must be recognized as a business entity in their country and provide proof to STMA annually; develop bylaws or other governing documents; and have a governing Board of Directors. The STA meets these requirements and officially

became an STMA International Affiliate Organization on November 5th.

In addition to sharing information and resources, STMA will list the STA on its website as an International Affiliate Organization, provide one membership annually to the President of the STA, and will offer to the membership of the STA conference registration and education and training resources at STMA member rates.

STMA President Abby McNeal, CSFM, was enthusiastic about the new partnership. "Officially establishing a relationship with the STA will help to connect our memberships and allow us to collaborate on issues common across the profession," says McNeal. "Our Board of Directors has much respect for the work of the STA, and we know we will learn from them."

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ABOUT STMA

STMA is the not-for-profit, professional association for the more than 2,800 members who manage sports fields in the USA. The membership's goal is to manage natural turf and synthetic surfaces to produce safe and aesthetically pleasing playing surfaces for athletes at all levels of playing abilities.

Gord Dol, STA President, concurs. "We believe that this is an important step forward in establishing an information conduit for organizations around the world to share research, knowledge and experience for the advancement of everyone involved in the sports turf industry." ♦

Editor's note: STA members may access the STMA conference registration form at member rates at [www.sportsturfassociation.com / Members Only / STMA](http://www.sportsturfassociation.com/MembersOnly/STMA). You must log-in to access this section of the website.

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Artificial Turf Dying in Major League Baseball



Former professional baseball player Maury Wills remembered back 43 years ago when he became the first batter to hit on artificial turf in a major league game. Even when the green rug was novel, he didn't like it.

I'm a traditionalist," said the former Los Angeles Dodger. "I'm still an old-school guy. I believe baseball was meant to be played outdoors and be played in the daytime."

Turns out, most others think baseball is better on grass, too. The sport's turf wars are nearing an end.

Once regarded as magic carpets that would eliminate bad hops and minimize rainouts, artificial surfaces are going the way of the dead ball and complete games.

When the Minnesota Twins open Target Field in April 2010, just two non-grass

fields will remain in the major leagues: the Rogers Centre in Toronto and Tropicana Field in St. Petersburg, FL. That's down from a high of 10 artificial surfaces in 1977-78 and again from 1982-94.

While colleges and high schools actually are installing more artificial fields – to accommodate multiple sports – artificial turf is unloved by Major League Baseball.

"Baseball in the Metrodome is an unnatural act," Atlanta Braves president John Schuerholz said. Next season will have just 162 games on artificial turf, the fewest since 1969.



Rogers Centre

"I'm personally very happy that they're gone," baseball commissioner Bud Selig said. "I understood the need for artificial turf, particularly in multipurpose stadiums. But I think the players are better off and I think that the game is better, so I'm happy."

Players who still spend a majority of their games on artificial turf say they can feel it.

Tampa Bay Rays manager Joe Maddon makes sure to give All-Star outfielder Carl Crawford days off when he has a lot of consecutive games on turf. "I got away with it when I was 21. I'm a little older now – I'm almost 30, and it becomes tougher," Crawford said. "It definitely takes a toll on your body when you have to play 81 games on it. And we're in a division where you play another nine games on the road. That means you're playing more games on it than you are on natural grass. Basically, you play the best you can with it, but it's not easy."

from Boston, was out in right field in a day game in St. Louis in July or August and it's 100 degrees. He had rubber cleats and had to call time out. They had melted. If I wore the metal spikes, it would have me branded under the soles on my feet on a real hot day, from the metal, it would sunburn my heel and the balls of my feet. I remember and I would go, 'Why are my feet on fire?'"

Los Angeles outfielder Torii Hunter, who spent nine seasons at the Metrodome, said the artificial turf was "like running in sand" and hurt his hamstrings, lower back, knees and calf muscles.

Hunter, who left the artificial turf of the Metrodome for Anaheim's grass after the

"I'm personally very happy that they're gone," baseball commissioner Bud Selig said. "I understand the need for artificial turf, particularly in multipurpose stadiums. But I think the players are better off and I think that the game is better, so I'm happy."

Gold Glove first baseman Keith Hernandez says grounders "bounced like a SuperBall." But that wasn't the biggest problem: His ankles aren't good to this day because of the turf at Busch Stadium in St. Louis, his home field from 1974-83. He would soak his feet in buckets of water while the Cardinals batted.

"On day games the thermometer would read 148 off the turf," he recalled. "I remember Reggie Smith, when we got him

2007 season, can't wait until it's all gone. While there's still artificial turf, his body pays the price.

"During the season, you feel it after your first couple games," he said. "It takes me like a month and a half to really get over some of the soreness that you have after the season." ♦

— Associate Press Baseball writer
Ronald Blum, Sept. 26, *Turfgrass Producers International E-Newsletter*, November 2009



ODDS & ENDS

STA Membership Plaques

Display membership plaques are available in executive engraved walnut for \$50 plus S&H & gst. To order, contact Lee at the STA office.

Spring 2010 Submissions

If you have something you'd like to submit for the next issue, please forward it to the STA office by February 26, 2010.

Editorial Content

Opinions expressed in articles published in *Sports Turf Manager* are those of the author and not necessarily those of the STA, unless otherwise indicated.

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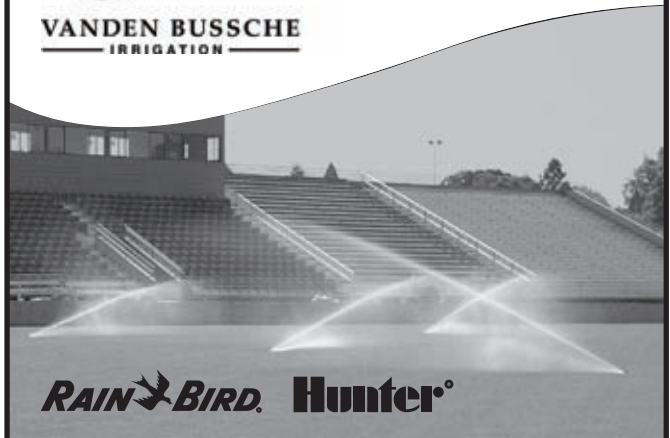
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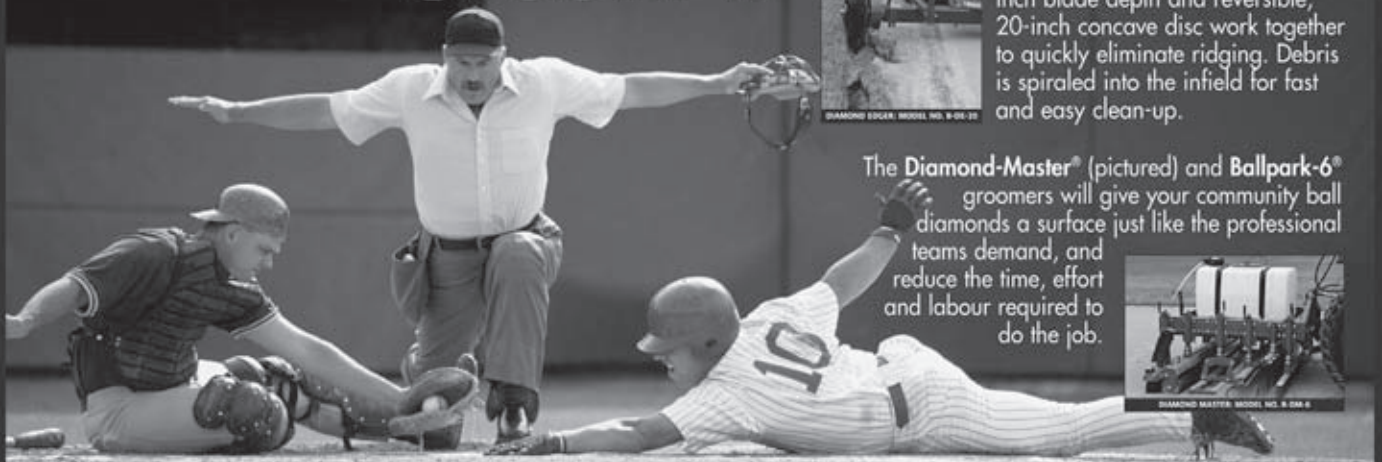


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FUELLING DEBATE: A LOOK AT THE PROS AND CONS OF GREEN FUELS

EDDIE KONRAD, AUTHOR, MECAHNIC'S CORNER, GREENMASTER

Some people look to the electric car, others to hydrogen, but in reality, we are likely to see several technologies converge to produce the fuel efficient engines of tomorrow.

Recently, the United Nations weather agency said that gases blamed for global warming have reached record levels in the atmosphere. Concentrations of CO₂ and nitrous oxide (N₂O) touched new highs in 2008, and methane had its largest annual increase in a decade.

There are many technologies that will be used to keep our equipment working economically in the future. Rather than a single predominant one, such as gasoline or diesel engines (CO₂ per litre of gasoline burned = 2.34kg/L; CO₂ per litre of diesel burned = 2.68kg/L), we will more likely use a combination. Some people look to

the electric car, others to hydrogen, but in reality, we will probably see several technologies converge to produce the fuel efficient engines of tomorrow.

Let's look at the different fuels we might use in the future and their pro and cons.

Battery

Electric cars are far from new. They were common between the 1830s and 1930s and re-emerged in the 1960s and 1970s. The first modern electric car was produced in 1996 by General Motors. The source of power for the electric car usually comes from rechargeable batteries (pure electric cars), fuel cells (fuel cell cars), or

a combination of gasoline and rechargeable batteries (hybrid cars).

These technologies are used today on walking greens mowers and riding mowers available in hybrid or battery drive, providing power, economy and low environmental impact. Unfortunately, pure electric equipment is impractical because the batteries need to be recharged, sometimes after cutting only a few greens or fairways, or even less in extreme hot or cold weather.

Recharging batteries can take as long as three hours for a full charge. To get more power, more batteries would be needed, increasing both weight and footprint on

greens and fairways. Furthermore, batteries have to be disposed off, which creates another environmental concern.

Biodiesel

Biodiesel is a renewable fuel derived from vegetable oils, animal fat and cooking oils. These oils and fat are made into methyl or ethyl esters. One of the big advantages to using biodiesel shows up in the engine. Analysis revealed that the improved lubrication qualities of biodiesel may increase some major engine parts longevity by as much as 100 percent and increased longevity reduces maintenance costs.

Disadvantages are that biodiesel has slightly less energy than regular diesel, so if we were to use biodiesel in a vehicle, the engine would either have less power or use more fuel to deliver equal power. Biodiesel causes fuel-system problems in cars, especially at low temperatures. It oxidizes faster due to its chemical makeup so storage of the fuel is more difficult.

The biggest disadvantage of biodiesel is that pure biodiesel begins to freeze

or solidify at low temperatures. Nitrous oxide can increase up to 6 percent and refining the renewable source of biodiesel causes greenhouse gases. To combat these problems, the Austrian company BDI (Bio Diesel International) is currently working on using algae as raw material for the production of biodiesel. The algae are grown either in fresh or salt water, need no agrarian land, and are fed by exhaust emissions stemming from caloric power stations which leads to a further reduction of the gases responsible for climate change. Algae produce 80 times more usable biomass than rape seed per hectare thus potentially eliminating the use of valuable agricultural product needed to feed the world.

Ethanol

Ethanol is a clear liquid that can be made from natural products and is diluted with gasoline to provide a cleaner, more natural fuel source. About 30 percent of all gasoline consumed is blended with ethanol, usually a combination of 10

percent ethanol and 90 percent gasoline. Ethanol is produced from crops such as corn, grain sorghum, sugar cane, wheat and biomass.

Ethanol has both economical and environmental shortfalls. Many acres of cropland are needed to produce ethanol, which makes it more expensive than gasoline. It contains one third less energy than gas, which means mileage is 30 to 40 percent lower. Massive ethanol production could cause a shortage of corn available for food and destroy habitat. It also increases smog in urban areas. The cost to produce and refine one litre of ethanol was \$2.19 in 2008 and is subsidized heavily by government.

Methanol

Also known as wood alcohol, methanol is an alternative fuel that can be produced from any carbon-based source like natural gas, coal, wood wastes and seaweed. Using methanol as an alternative fuel source is good because it produces lower emissions, yields higher performance, and has



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a lower risk of flammability than gasoline. Because the use of methanol creates better performance and acceleration, it is used as the fuel for Indy race cars, monster trucks and model vehicles.

Methanol is more corrosive than gasoline so parts that come into contact with methanol must be able to withstand its corrosive ability. Also, because the air to fuel mixture is richer than gasoline, a given volume of gasoline will take you about 70 percent farther than the same sized tank of methanol. Methanol is a very toxic substance and can be harmful if swallowed, absorbed through the skin or inhaled. Ingestion of just 1 to 4 ounces can cause injury to the nervous system, blindness or even death.

Hybrids

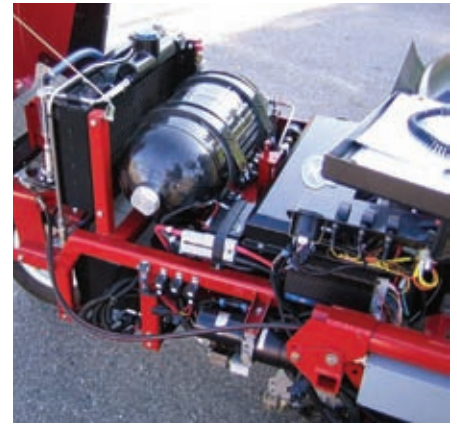
A hybrid electric vehicle (HEV) uses an electric motor and a gasoline engine. The engine charges the battery and extends the range and provides extra power. The fuel tank is the energy storage site for the gasoline engine. The generator produces

electric power. The batteries are the energy storage devices for the motor. The motor can put energy into the batteries as well as take energy away from them. The engine has enough power to keep the equipment moving, and the extra electric motor and battery provide the additional power needed to go up steep hills. The batteries in today's hybrids require nickel, which is costly, and big battery packs and other components can add \$2,000 or more to the cost compared to conventional models. The large battery packs degrade performance and increase the footprint of the associated turf equipment.

Natural Gas

Natural gas is basically methane (CH₄). Its largest advantage is its chemical composition. Because methane only has

Adjacent Top. The on-board hydrogen 26L Dynatek fuel cylinder capable of containing 0.63 kg of hydrogen at 5000 psi. Adjacent. Toro's mid-duty fuel cell hybrid combining a Maxwell ultracapacitor bank and Hydrophonics fuel cell.



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one carbon in its composition, it produces very low carbon emissions. The second major advantage of natural gas is convenience. The gas is pumped directly on the consumer's property. Because of the abundance of natural gas, it is cheaper to burn than oil.

Fuel Cells

These devices generate electricity by converting hydrogen and oxygen into water. Here is what happens in a fuel cell. When hydrogen gas pumped from the fuel tanks arrives at the anode, which is made of platinum, the platinum catalyzes a reaction that ionizes the gas. Ionization breaks the hydrogen atom down into its positive ions (hydrogen protons) and negative ions (electrons).

Both types of ions are naturally drawn to the cathode situated on the other side of the membrane, but only the protons can pass through the membrane (hence the name "proton-exchange"). The electrons are forced to go around the proton exchange membrane, and along the way they are shunted through a circuit, generating the electricity that runs the car's systems.

Using the two different routes, the hydrogen protons and the electrons quickly reach the cathode. While hydrogen is fed to the anode, oxygen is fed to the cathode, where a catalyst creates oxygen ions. The arriving hydrogen protons and electrons bond with these oxygen ions, creating the two "waste products" of the reaction – water vapour and heat. Some of the water vapour gets recycled for use in humidification, and the rest drips out of the tailpipe as "exhaust."

This cycle proceeds continuously as long as the car is powered up and in motion; when it's

idling, output from the fuel cell is shut off to conserve fuel, and the ultracapacitor takes over to power other components. Ultracapacitors (sometimes called double-layer capacitors or supercapacitors) store energy electrostatically by polarising an electrolytic solution. Unlike batteries, no chemical reaction takes place when energy is being stored or discharged and so ultracapacitors can go through hundreds of thousands (or even millions) of charging cycles with no degradation.

Ultracaps are highly efficient, so little energy is lost during the charging and discharging process (typically <1 percent). As they do not depend on a chemical reaction

most inspiring and exciting use for this element would be for use as a fuel. Scientists have been exploring this for many years and now it is becoming more of a possibility as prototype hydrogen equipment and motors are being tested.

The production of hydrogen is very cheap and easy. Hydrogen is actually a by-product in the steam reforming of natural gas. Since natural gas already has a variety of uses in our society, this would be a very cost efficient way to produce pure hydrogen. Although the change will be tough, some of the benefits will be great.

For example, it is much more environmentally friendly to burn hydrogen

could mean higher mileage. One of the main disadvantages is the explosive property of hydrogen. This means that special precautions will have to be taken for pumping and storing. There's no distribution system or standardized method of storage, which is crucial since hydrogen fuel is a gas that must be kept under high pressure.

Significant work still remains to make this a reality. Lots of data must be collected to ascertain the proper power specifications for the fuel cell-hybrid system. Carrying sufficient onboard fuel

Prototype hydrogen equipment and motors are currently being tested.

Hydrogen is readily available and more environmentally friendly to burn than gas. On the flip side, it's highly explosive and both storage and distribution systems still need work.



to store energy, ultracapacitors can operate in a very wide temperature range effectively – typically from -40° to +70°C.

When hydrogen is used in fuel cells, there are zero emissions. Toro and the New York State Energy and Research Development Authority (NYSERDA) joined forces to assess the potential of fuel cell utility vehicles at Niagara Falls State Park. NYSERDA had selected Toro to receive grant funding to develop the hydrogen powered vehicles. Toro converted two mid-size utility vehicles and one heavy duty utility vehicle using a fuel cell in a series-hybrid configuration. Without the fuel cell, the batteries would only provide about 20 to 30 minutes of run time. Since the fuel cell keeps the batteries charged, the batteries can provide 15 to 20 kW (20 to 27 hp) of peak power when needed. To date, these utility vehicles have operated fairly reliably and met or exceeded performance expectations.

Hydrogen

Hydrogen is a colourless, odourless gas that accounts for 75 percent of the entire universe's mass. Hydrogen is found on Earth only in combination with other elements such as oxygen, carbon and nitrogen. To use hydrogen, it must be separated from these other elements. The

than to burn gasoline. Another advantage to switching to hydrogen would be the availability of the resource. One last major advantage is the fact that it would be cheaper to refine than gasoline and thus would be cheaper for the consumer. Golf courses could have their own stations to produce and store hydrogen. The only tailpipe emission is water.

The Toro riding greens mower prototype utilizes a 7 kW hydrogenics PEM fuel cell and a bank of ultra-capacitors in a 48Vdc series-hybrid configuration. Onboard hydrogen is carried in a 26L Dynatek composite compressed gas fuel cylinder capable of containing 0.63 kg of hydrogen at 5,000 psi (350 bar). Field trials have demonstrated it capable of quietly and effectively mowing an entire 18-hole greens route without refuelling.

Other manufacturers of grounds equipment are also exploring fuel cells. Hydrogenics Corporation, a designer and manufacturer of fuel cell technology, announced in Toronto (June 2009) that it has sold six of its 10-kilowatt fuel cell power modules to Deere & Co. for integration and evaluation in off-road vehicle applications including grounds equipment and utility vehicles.

Pound for pound, hydrogen fuel has more inherent energy than gasoline, which

is challenging, especially utilizing the large, cylindrical compressed gas tanks. Many of the components are prohibitively expensive, and economies-of-scale must be realized on several fronts to reduce the cost.

Finally, it is unclear how affordable hydrogen fuel systems will work, particularly in applications where the entire fleet consumption may be less than 10-20 kg/day. One solution could be "Hydrogenics On Site Generation" which offers a full line of HySTAT hydrogen station and turnkey hydrogen generating solutions for a wide range of hydrogen generating and refueling options. Despite obstacles, customer satisfaction and demonstrated technical viability offer hope that some day hydrogen fuel cells might be a common sight on your local golf course. Even though there are some large disadvantages attached to the switch to hydrogen, it will be very beneficial in the long run and will finally eliminate damage to our environment. ♦

— *Greenmaster*, July/August 2009, Vol. 44, No. 4, Cdn. Golf Superintendents Association

The author thanks Jack R. Rust, R&D Chief Engineer, and Carl Osterhaus, Service Education Manager of The TORO Company, for providing photos and expert technical help to make this article possible.



Hough Group

IN-HOUSE, ARCHITECT-BID-CONTRACTOR, DESIGN-BUILD, OWNER'S REPRESENTATIVE. WHAT WORKS BEST FOR BUILDING YOUR SPORTS FIELD?

STMA ADVISORY BULLETIN 3, WWW.STMA.ORG

*As a sports turf manager, you have the knowledge to advise the owner.
What will be your recommendation?*

Your organization has decided to build a new sports field and has determined which type of field is needed. Whether it is a single synthetic field, or a natural grass field, or a multi-use sports complex with both field types, one of your next steps is to determine the best method to get your project built.

As the sports turf manager, you have the knowledge to advise the owner. What will your recommendation be?

- Should your organization complete the project in-house?
- Hire a design professional, and when the plans are completed, bid it and subsequently hire a contractor?
- Or, is your project better suited to hiring one firm to design and build the project?

- Do you need to hire an owner's representative?

All options can provide your owner with a quality outcome, but each has unique considerations. There are also many variations on these models with some approaches using elements from several models. This technical bulletin will outline the advantages and disadvantages of these four conventional models.

Key Considerations

Generally, three major factors can influence the decision about which type of professional service you select:

1. Complexity of the project.

The complexity of your project can be a major decision-making factor for select-

ing in-house or another model for your project.

Consider the answers to these questions:

- Do you need any site use and utility studies completed? Environmental impact or analysis studies? Marketing and economic feasibility studies? Special cost or energy analysis?
- Are there zoning and planning approvals necessary? Will you need help with preparing materials for public referenda or any special drawings, models and presentations?
- Do you need help with developing financing opportunities?
- Are there any community concerns?
- Will your project be challenged by any climatic impacts? Unusual topography? Geotechnical characteristics? Ecological

features? Water issues or drainage accessibility?

2. Time you have to complete the project

The project's timeline can be another factor that influences which project process you pursue. All projects must have a realistic timeline that allows for appropriate approvals and decision making. Answer these questions to help direct you:

- Do you have adequate time to complete the project in-house while managing other responsibilities?
- Do you have time to select the architectural/design firm, have the design completed and subsequently hire a contractor?
- Do you need to fast track a project, overlapping design and construction phases?
- Do you need the time efficiencies a consultant may provide by effective coordination?

3. In-house expertise/resources available

Another major factor in considering the right delivery model is the availability and knowledge base of staff assigned to your project.

- Does your staff have the appropriate design, construction and project management experience? Easy access to equipment and materials?
- Do you have an in-house representative, such as a CSFM or professional sports turf manager, who can monitor the project's progress? Or, are you willing to hire one?
- How involved in the process does the owner wish to be?

In-House

For organizations that are renovating or building a new field or complex, handling it in-house is an ideal solution if time and resources are available. Many organizations have architects, purchasing departments and construction expertise on staff for the sports turf manager to utilize. However, some sports turf managers are unable to place on-hold the other duties of their jobs to undertake a project. It is challenging to design, manage, build a field, and continue with daily responsibilities.

Advantages of in-house

- Provides total control of the project.
- Well suited to urgent projects and less definitively scoped projects.

- Allows for quicker and more nimble decision-making.
- Permits fast mobilization of resources.
- Streamlines the budgeting process.
- Creates a team with a single sense of purpose.
- Protects the owner's investment because the owner is in charge.

Disadvantages of in-house

- Not well suited to large, complex projects.
- Must be able to prioritize the project within the organization's structure.
- Must have design and construction management experience on staff.
- Must have construction labour on staff with access to the necessary equipment.

Architectural/Design Firms

Typical services

Architectural/design firms offer a wide range of services. The owner first contracts for the design of the project. The design professional:

- Determines and oversees any site planning and evaluation services.
- Prepares plans and specifications.
- Usually assists in the bidding stage.
- May provide oversight of the project during the construction phase.
- May provide facility administration services following construction.

The design of the project is complete before the contractor is selected. The owner contracts separately with the contractor and retains the responsibility for overall project management.

Contract management function

In an architect/designer-bid-contractor model, the architect/designer may have a key role in assisting the owner with the hiring of the contractor and in managing the construction project. The architect/designer may:

- Evaluate the work for compliance with the drawings and specifications.
- Approve shop drawings, materials and project samples.
- Review the results of material tests and inspections.
- Approve the contractor's requests for payment.
- Handle requests for design changes during construction.

Basic Definitions

For Professionals Who May be Involved in Your Project

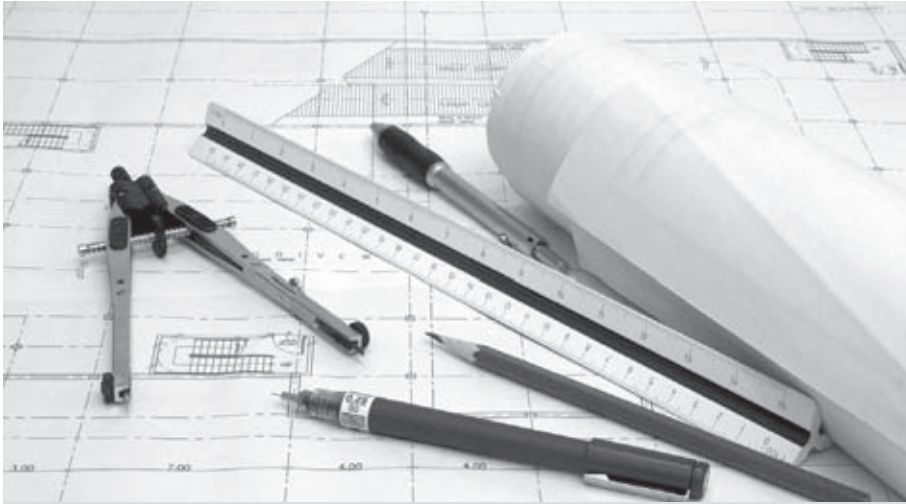
Architect. One who has completed a course of study in building and design, served an internship, and is licensed as an architect. The architect typically produces a set of plans and specifications on which the construction contract is based and is a member of the project team.

Certified Sports Field Manager (CSFM). The professional designation for a sports turf manager who has met the education and experience requirements of the Sports Turf Managers Association's (US) certification program and successfully passes the rigorous four-hour exam. Once certified, a combination of continuing education and industry service is required.

Construction Manager. May be involved in overseeing scheduling, cost control, construction, bidding, or the entire project. A construction manager is most useful on a large, complex project which requires a good deal of oversight and coordination.

Design Professional. Generally refers to architects, engineers, landscape architects and others whose services are "professional" activities requiring licensing or registration by the province or territory, or otherwise require the knowledge and application of design principles appropriate to the problem at hand.

Landscape Architect. A licensed design professional who plans, designs, manages, preserves and rehabilitates land. He/she provides design services for urban design, parks and recreation, environmental restoration, golf courses, etc.



Basic Definitions Continued...

Owner's Representative. Typically educated as a planner, architect, certified cost analyst or construction manager, he/she is responsible for coordinating all aspects of the project including master planning, design, preconstruction and construction administration. This person essentially takes the project from conception through completion with the express purpose of protecting the owner's financial interest. On smaller projects, this consultant may actually complete all phases him/herself.

Professional Engineer. Has fulfilled the education and experience requirements and passed the exams that permit him/her to offer engineering services. PEs take legal responsibility for their engineering designs and are bound by a code of ethics to protect the public health and safety. They have the authority to sign and seal or "stamp" engineering documents (drawings and calculations) for a design or a structure, thus taking legal responsibility for it.

Request for Proposal (RFP). A document that a company or organization sends to vendors to elicit a bid for products or services. An organization typically issues an RFP in order to assess competing bids. The RFP language should convey the full scope of the work desired and must produce responses complete enough for the issuing organization to make distinctions between competing vendors and determine which vendor is the right fit for the project. When used for a construction bid, the response to the RFP provides to the client a recommendation from the contractor on the best method of construction. Each project and site is different and each RFP should also be unique. Usually requires a representative, staff member or hired consultant who is knowledgeable in the scope of work covered by the RFP to assess the responses.

Request for Qualifications (RFQ). Usually a more basic request, asking for much of the information that would typically appear on the CCDC (Canadian Construction Documents Committee) 11 Contractor's Qualification Statement with some additional information. It is often the first stage of a two-stage procurement process that results in identifying companies that are qualified to do the work by their experience, financial strength and organizational resources. In such cases, only these pre-qualified companies are permitted to respond with pricing proposals. The process narrows the field allowing the client to only review bids and evaluate bids from companies that are determined to be qualified to perform the work. Organizations that are not required to take the lowest bid may use a more detailed RFQ process and do not subsequently develop an RFP. Usually requires a representative, staff member or hired consultant who is knowledgeable in RFQs to assess and validate the qualifications.

- Administer the completion, startup and close out process of the project.

Advantages of architect/designer-bid-contractor

- Minimizes risk through the owner's control of the design and construction phases.
- Offers checks and balances between the construction participants.
- Provides the owner with significant opportunity for input into the process.
- Is a well-understood and widely used model.
- Brings together a wide range of resources to solve complex problems.

Learn more! This topic will be addressed at OTS 2010. For details, visit www.ots.open.uoguelph.ca.

Disadvantages of architect/designer-bid-contractor

- Can be a lengthy process.
- Requires significant front-end economic commitment (since design is completed prior to bidding the construction phase, the bids could exceed owner's budget).
- Requires in-house expertise to coordinate and arbitrate between separate design and construction contracts (or must be willing to hire an independent representative).
- May place owner in an arbitrator position between design and construction.
- May require more change orders and ensuing costs as the project is constructed.
- May still require hiring an owner's representative to review plans and make recommendations to help reduce change orders and other potential expenses.

Design-Build

A design-build firm has full accountability for design, engineering and construction – taking the project from concept to completion. Consider the following when deciding if this "single source" service is right for your project:

Advantages of design-build

- Provides a single point of responsibility for design, construction, cost, quality and schedule adherence.
- Takes the owner out of the middle of

disputes between architect/designer and contractors.

- Allows for earlier knowledge of costs because the same team simultaneously estimates construction costs.
- May provide for faster completion due to the elimination of bidding periods and the overlap of design and construction.

Disadvantages of design-build

- May require specialized in-house staff or a consultant to develop the RFP or RFQ, oversee the project, and maintain quality control. It can be complex to write a comprehensive RFP for design and construction.
- May not be allowed by your owner. Some government entities may require the traditional architect-bid-construction process.
- May not be able to purchase liability coverage. Some liability insurance/payment bond carriers may not be familiar with design-build and adequate coverage may not be available.
- With the same firm designing and

building the project, there may not be an independent, third party providing the necessary "checks and balances" to protect the owner.

Owner's Representative

This model employs a consultant, such as a CSFM, who ensures that plans are prepared correctly and construction is sequenced properly and executed as intended. For larger projects, this person may be hired in conjunction with a traditional architect-bid-construction service or to monitor a design-build project. For smaller projects, this person may fulfill all roles.

Advantages of an owner's representative

- Removes owner from conflict resolution between the architect/designer and contractor.
- Protects the owner's interests because sole allegiance is to the owner.
- More efficient coordination may result in less change orders, thus reducing costs.
- Highly knowledgeable consultant can

save time and money.

- Well suited to large, complex projects or small projects where there is limited in-house expertise.

Disadvantages of owner's representative

- Adds another tier of decision-making.
- Contributes to the overall expenses of the project.

Summary

These are just a few considerations that may help you to determine the appropriate process to build your sports fields. Many options and variations exist. It is recommended that you further investigate these options with the Royal Architectural Institute of Canada (www.raic.org) and the Canadian Design-Build Institute (www.cdi.org). Other relevant links include the Canadian Construction Association (www.cca-acc.com), the Canadian Society of Landscape Architects (www.csla.ca) and the Canadian Council of Professional Engineers whose website is www.engineerscanada.ca. ♦

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Why Classify?

WITH RESPECT TO SPORTS FIELDS

R.W. Sheard, Editor-in-Chief, Athletic Field Construction Manual

Classification defined: "To arrange or group in classes according to some system or principle."

Classified advertising in the newspaper is an example with which everyone is familiar where items for sale, job opportunities, etc., are listed in alphabetical order. Libraries use a classification system to allow librarians to find a specific book among the millions of holdings on the shelves. For example, the Library of Congress Classification System identifies the *Athletic Field Construction Manual* as GV413.A84 2008. In fact, Open Text, a very successful Canadian computer company in Waterloo, Ontario began by computerizing the classification system for university libraries.

In botany, a classification system was developed by a Swedish botanist, Carolus Linnaeus, to arrange the names of all plant species into a logical classification system.

Thus, when the name "Gramineae" is seen, one immediately knows the author is referring to some grass plant. When the additional words "Poa annua" are added, the grass plant becomes a specific organism. It is so specific that no other grass plant can have the same characteristics. It is also known by the common name, annual bluegrass. Common names, however, may change from region to region. In Ontario, everyone knows what annual bluegrass is. But in other regions it may be called "sweet grass." If the scientific name "Poa annua" is used, there is no confusion about what plant is being discussed.

In the early 20th century, Russian soil scientists used a similar concept to developing a system for classifying soils. Based on surface geology, texture and observ-

able features of the soil profile (cross section to a depth of one to two metres), they separated soils into groups beginning with the basic unit, the soil series. There are over 400 different soil series mapped in Ontario. When a user sees that soil series name on a map or report, it immediately brings to mind certain information about the soil.

For example, a soil in Ontario mapped as the Guelph loam series informs the user of the map or report that the soil is located on the upper slopes of a slightly rolling topography; that the soil has developed on glacial till and contains a few stones; that the soil is well drained; and that it has a loam texture which indicates it has approximately one third each of sand, silt and clay. A knowledge of the underlying geology of the area would also infer that the soil has a pH above 7.0. Thus by using a classification system, a great deal of information can be conveyed by just two words – Guelph loam.

The Sports Turf Association developed a classification system for athletic fields when they prepared the *Athletic Field Construction Manual*. In the past, organizations such as municipal parks departments have developed in-house classification systems for their athletic fields based primarily on the sport for which they are used. For example, one municipality chose to classify its fields according to the sport for which it was to be used and the availability of irrigation. The editorial group for the STA manual, however, chose the physical requirements of the root zone, independent of the sport to be played on the field.

The basic unit of classification of fields in the STA system (Figure 1), comparable to the soil series in the soils system or the genus and species in the plant system, is the materials used in the construction of the root zone on which the turf will grow. This separation is based primarily on the amount of silt and clay which is permitted in the root zone and consists of five categories.

A Category 1 field is essentially a field constructed using USGA specifications which only allow 8% silt plus clay in the root zone mix. The remaining 92% of the total is sand which must meet certain

specifications regarding its particle size distribution, porosity and water retention. The remaining four categories allow for more silt and clay in the root zone mix. The fifth category may be built on any *in situ* soil, where minimum disturbance of the existing soil profile occurs.

Moving down the classification system, the second level of separation is irrigation. This level of separation occurs below drainage because a fully functioning drainage system is a prerequisite to the installation of irrigation to guard against excess water in the root zone due to improper timing of irrigation with rainfall events.

The third level of separation is the installation of subsurface drainage. All sports fields should be constructed with drainage to guard against excess water in the root zone.

The final level of separation is the availability of lights which reflects the amount of use the field will receive due to extended hours of play and the level of maintenance the use of the fields will

demand. Often other physical structures such as stands, change rooms, paved parking, etc., will be associated with the provision of lights. The fields will primarily be associated with scheduled, ticket-requiring games by professional players.

Based on the classification system, developed by the authors of the manual, a person immediately knows that a Category 1 field will have drainage, irrigation and a sand root zone. The field may be used for any sport, baseball, soccer, thoroughbred racing, as long as the dimension requirements of the turf area which the field is used for are adhered to.

The acceptance and use of the classification system will alleviate many of the problems in discussing management, scheduling or other items associated with athletic fields using natural turf. For example, if discussing a Category 2 field, it will immediately be known that the field has 25% or less silt and clay, is drained and irrigated, but may or may not have lights. ♦

FIGURE 1. THE STA ATHLETIC FIELD CLASSIFICATION

LIGHTS

Drainage

- Irrigation
 - Category 1
 - Category 2
 - Category 3
 - No irrigation (not recommended)
- No Drainage** (not recommended)

NO LIGHTS

Drainage

- Irrigation
 - Category 1
 - Category 2
 - Category 3
 - Category 4
- No Irrigation
 - Category 3
 - Category 4

No Drainage

- Irrigation (not recommended)
- 1 No Irrigation
 - Category 5

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Bill Clausen, Facility Manager, University of Guelph



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impaired client to the proper location, we can make our facilities accessible.

Building and renovating facilities ahead of the curve also makes financial sense. Conforming to the expected standards of 2025 now will save money in the long term. It also means you can expect to increase your revenue base if people with disabilities discover your facilities are totally accessible – not just in the physical sense but also with respect to customer service, transportation and employment – they will become enthusiastic clients/customers.

All the information you need to know about these standards is available on the Ministry of Community and Social Services website www.mcsc.gov.on.ca/mcsc/english/pillars/accessibilityOntario.

This site provides access to the latest press releases with up-to-date information on what to expect next. For example, the lead item is about the proposed Accessible Employment Standard which is designed to help employers provide equal opportunities for people with disabilities. This is the next piece of legislation with which we will have to comply.

There is also a section on complying with the Accessibility Standards for Customer Service and how to report your compliance. There are links to Accessibility and Your Business which can help

you apply for financial assistance to make your organization accessible, help you welcome customers with disabilities, and give you information on why being accessible is good for your business.

Information is readily available about the Ontarians with Disabilities Act 2001 – frequently asked questions, helpful links where you can find information, and resources to help with accessibility planning.

For training purposes, there is a quick link to an online course, Serve-Ability, to provide training for your staff. It takes about 45 minutes and will help your staff provide better customer service to people with disabilities.

In conclusion, Ontario is striving to bring a segment of our population into the twenty first century where they belong. As an industry, the sports turf community needs to embrace these progressive changes to make all Ontarians welcome in our facilities and organizations by providing exceptional customer service to all. ♦

QUICK FACTS

1.85 million Ontarians have a disability and this number will grow as the baby boomer generation ages.

More than 200 people participated on committees that drafted accessibility standards.

Accessibility standards are being phased in to give businesses and organizations time to break down barriers for people with disabilities over planning cycles.



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