

Sports Turf Manager

for safe, natural sports turf

Winter 2008

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Research at MSU

Playing Surfaces and Injury Risk
Researchers at Michigan State University use a mobile testing apparatus (note the "foot" pictured below) to measure torque on different surface systems. See pp. 12-13 for the results.



Holistic Turf Management in Halifax Regional Municipality

DR. R.W. DANIELS, DEP'T ENVIRONMENTAL SCIENCES, NS AGRICULTURAL COLLEGE (RETIRED)

Halifax Regional Municipality (HRM) consists of approximately 1400 "green sites" which include playgrounds, ball and sports fields. There are approximately 160 ball diamonds and 120 sports fields. A staff of 80 individuals is involved in maintaining these areas with approximately 50 designated specifically to sports and ball fields. The municipality covers a geographic area of 5,600 square kilometres and serves a population of 350,000.

HRM has few concentrated areas of sports fields (complexes), although most are within a 30 minute distance from an equipment depot. The location of these fields requires a great amount of time in transporting equipment and personnel to and between the various sites. All sites and individual fields are located in a pesticide free zone so the turf can

only be improved by using "best management practices," excluding the use of pesticides.

Beginning in the fall of 2006, I was invited by Peter Verge, Superintendent of Sports Fields and Recreational Facilities, to develop and implement a program to improve and upgrade HRM staff and existing turf and playability of these areas with a specific emphasis on recreational fields. At its inception, it was realized that this may take up to five years to accomplish fully. Annual goals were set, and their results are reviewed and modified when necessary on a regular basis.

In setting goals, two specific criteria were followed. Individual yearly goals were developed in advance (at the beginning of each year) and were set high. The premise was that it is preferable to set high goals, even if they are not always attained, rather than set low goals and claim "easy success." → page 8

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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 – a time to sit back and reflect on the past season and analyze what went well and what didn't. For many of you, it is also budget time. With what is going on in the world and here on the homefront along both economic and political lines, budget setting is sure to be a particularly daunting task for 2009.

The Ontario Turfgrass Symposium (OTS) will be on February 18 and 19 in Rozanski Hall at the University of Guelph. This year promises to be another great educational forum. A summary of the sports turf related sessions is inside on page 7. There are also a number of informative plenary sessions for your consideration. Complete details are available at www.open.uoguelph.ca/ots. The Sports Turf Association is proud to present this professional development program together with the Guelph Turfgrass Institute, Nursery Sod Growers Association of Ontario, Ontario Ministry of Agriculture, Food and Rural Affairs, Ontario Recreation Facilities Association, Professional Lawn Care Association of Ontario and the Office of Open Learning, University of Guelph.

During the OTS, we hold our annual general meeting which is open to all members. We urge you to join us to learn more about the association and our initiatives. The meeting will be held on February 18 at 3:30 p.m. We will also be electing 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. The Call for Nominations and Nomination Form has been mailed to all members in good standing. They are also available in the Members Only/Member News section of the website www.sportsturfassociation.com. Deadline for nominations is December 19.

Also in this issue, we provide an update from the Parks and Open Space Alliance with details of the Parks and Open Space Professional Training Program being offered in Guelph in April and Petawawa in September, 2009. The Sports Turf Association



will be delivering the Sports Turf Management and Maintenance portion of this three part certificate program. This is one phase of the development of certification programs outlined in our strategic planning initiative.

At this time last year you were asked to participate in a research study on the economic profile of the Ontario turfgrass industry. Survey results have been compiled and will be presented at the 2009 Ontario Turfgrass Symposium. This is the first comprehensive overview of the economic significance of the Ontario turfgrass sector since 1982. ♦



EVENT CALENDAR

January 6-8

Landscape Ontario Congress
Toronto, ON
Info: 905.875.1805
www.locongress.com

January 13-17

*Sports Turf Managers Association
20th Annual Conference & Exhibition*
San José, CA
Info: 800-323-3875
www.stma.org

January 21-23

*Ontario Golf Superintendents'
Association Golf Course Management
Conference & Trade Show*
Info: 519.767.3341
www.golfsupers.on.ca

February 2-27

*University of Guelph
Turf Managers' Short Course*
Guelph, ON
Info: 519.767.5000
www.open.uoguelph.ca/turfmanager

FEBRUARY 4 & 5

*Ontario Parks Association
53rd Annual Educational Conference
Explorations Trade Show (Feb. 5)*
Hamilton, ON
Info: 905.864.6182
www.opassoc.on.ca

★ **FEBRUARY 18 & 19** ★

*Ontario Turfgrass Symposium
The Challenge of Green*
University of Guelph
Guelph, ON
Info: 519.767.5000
www.open.uoguelph.ca/ots

★ **FEBRUARY 18** ★

*Sports Turf Association
Annual General Meeting*
University of Guelph (at the OTS)
Guelph, ON
Info: 519.763.9431
www.sportsturfassociation.com

February 22-25

*Western Canada Turfgrass Association
46th Annual Conference & Show*
Victoria, BC
Info: 604.467.2564
www.wctaturf.com

NEW! Parks & Open Space Professional Training Program

POSA (Parks and Open Space Alliance) is pleased to announce its latest professional development initiative, the Parks and Open Space Professional Training Program – Level 1, designed for seasonal workers as well as full-time parks and open space personnel.

The program consists of three, four-day courses: Parks Maintenance and Operations; Parks Equipment Safety Operation;

Mark Your Calendar! POSA Summer Operational Forum, Wednesday, June 24, 2009, Oshawa, Ontario.

and Sports Turf Management and Maintenance. Each of the three courses is taught using a combination of classroom-based study and some hands-on training. Participants are expected to be able to return to their workplace and utilize the skills and knowledge they have learned in the courses. The hands-on portion of each course requires participants to arrive in appropriate work clothes including CSA-approved footwear.

In order to successfully complete the program, participants must also have a minimum Grade 12 education, be a mem-

ber of the OPA, the ORFA or the STA; maintain current WHMIS and Standard First Aid training; and have a minimum 24 months related practical work experience affirmed by an immediate supervisor.

All three courses will be offered in Guelph from Monday, April 27 to Thursday, April 30, 2009 and in Petawawa from Monday, September 28 to Thursday, October 1, 2009. For registration information, please visit www.orfa.com.

What is POSA?

The Parks and Open Space Alliance (POSA) is a coalition of the Ontario Parks Association, the Ontario Recreation Facilities Association and the Sports Turf Association dedicated to strengthening parks and open space practitioners through professional development, recognition and advocacy. For more information, please visit www.opassoc.on.ca, www.orfa.com, or www.sportsturfassociation.com.



ODDS & ENDS

STA Membership Plaques

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

Spring 2009 Submissions

If you have something you'd like to submit for the next issue, please forward it to the STA office by February 27, 2009.

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.

Turf Managers' Short Course Celebrates 40th Anniversary

The Turf Managers' Short Course (TMSC) at Guelph will celebrate its 40th year of offering top training to turf professionals. Management and staff can benefit from this program by attending the TMSC, being held at the Guelph Turfgrass Institute February 2 to 27, 2009. In this highly valued four-week certificate program, students will learn about a variety of issues facing today's professional turf manager. Sessions explore topics relating to soil, the value of irrigation, disease and pests, landscape and turf management practices and other helpful insight leading to superior turf care.

"The ongoing success and longevity of this certificate program is an indication of its importance to turf care in Canada and abroad," according to Rob Witherspoon, Director, Guelph Turfgrass Institute.

"The combined expertise of both industry and academic instructors makes the Turf Managers' Short Course a unique learning experience for individuals in the turf business," adds Steve Fleischauer, Manager, Program Development, Office of Open Learning, University of Guelph. "Students can be assured that they are getting the most current science and turf techniques available."

Learn more about TMSC 2009 and its unique classroom experience by visiting www.open.uoguelph.ca/turfmanager or by calling 519.767.5000.



Welcome to the STA!

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New Resource

Partners in Training Launches Innovative Website

Partners in Training and the Lifestyle Information Network would like to announce the launch of the Partners in Training website where recreation professionals can find all their training and professional development needs and where schools and training organizations can connect with their audience directly.

Partner organizations include the Sports Turf Association, Ontario Parks Association, Ontario Recreation Facilities Association, Parks and Recreation Ontario, the Canadian Red Cross, Lifesaving Society, Older Adult Centres Association of Ontario, Steps Canada and Therapeutic Recreation Ontario.

Our vision is to encourage the development of industry guidelines related to training that creates and maintains safe, enjoyable, good quality recreation environments.

As an individual, student or professional, the Partners in Training website is a great tool to access the specific training you need to achieve success in your field.

A *Guideline for Training* has also been created as a tool for training organizations and is available as a PDF file on the website.

Visit www.partnersintraining.ca and see how easy it is to search for your training needs. For more information, contact Amanda Street-Bishop at astreet-bishop@lin.ca.

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Seasons Greetings

from Lee & the Board of the Sports Turf Association

TURF... LIKE A FINE WINE?

Wine connoisseurs are noted for their unique and vibrant descriptions of fine wines. Having said that, have you ever wondered how turfgrass might be described if it were judged in somewhat the same manner?

Turfgrass Connoisseur
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"Provides a refreshing scent of nature combined with an earthy aroma that encircles the senses in a joyous celebration of environmental effervescence. Can be enjoyed throughout the day; be it in the early hours as dew enhances and brings out its inviting fragrance; midday with its cool-to-the-flesh approachability, or in the early evening when its lush and robust scent seems to cloak the air like a wondrous yet faint perfume that elevates the consciousness, the human spirit and the senses. The soft, subtle fragrance provides refreshing hints of childhood memories and memories yet to be."

— Jim Novak, *Turfgrass Producers International E-Newsletter*, Vol. 1 (5) Dec. 2008

STA PARTNERS WITH MSU TO INCREASE FULL TEXT ACCESS TO TURF RESOURCES

At its Annual General Meeting in February 2008, the STA announced the establishment of the Michael J. Bladon Educational Link to the Michigan State University's (MSU) Turfgrass Information File (TGIF). The blanket subscription provides an opportunity for the association to make the resources of the Turfgrass Information Center (TIC) available to its membership and, in addition, support the continued expansion of the content and availability of the Center's information.

make available *to the public* the complete back files of our *Sports Turf Newsletter* and *Sports Turf Manager*. Future issues will be accessible on the archive site six months after publication. In embarking on this project, scheduled for completion in 2009, we join the ranks of such publishers as the International Turfgrass Society, Sports Turf Research Institute, Sports Turf Managers Association, Golf Course Superintendents Association of America, and the Canadian Golf Superintendents Association who, along with

MSU has the most comprehensive publicly available collection of turfgrass educational materials in the world. And the Sports Turf Manager is now part of this invaluable resource. STA members can access it via our website.

Access to the *full text* (not just abstracts) of research reports, periodicals and other management content can be challenging as most turf professionals don't live near a research library. This access is changing. The Turfgrass Information File, originally conceived to index and abstract the literature of turfgrass, has now taken dramatic steps to increase user access to the full text of articles. And the STA is on board.

The Sports Turf Association is partnering with MSU to digitize and

others, provide the more than 35% of linked full text articles in the TIC's primary database.

The Turfgrass Information Center contains the most comprehensive publicly available collection of turfgrass educational materials in the world. STA members can access this information via the Michael J. Bladon Educational Link. Login to www.sportsturfassociation.com and follow the link under the "Members Only" section.

LETTER

To President Gord Dol, Members of the Board of Directors, Executive Manager Lee Huether and Fellow STA Members

Thank you for the extraordinary gift of the Michael J. Bladon Link to the Michigan State University's Turfgrass Information File. There were many who played an important role in the formative years of the Sports Turf Association and to whom appreciation must be expressed. These include my wife Elaine and family for their administrative contributions, and the many members of past boards whose hard work and dedication has brought the association where today it plays an important role in the sports turf industry. I am pleased that the board has made this link available as an invaluable resource for those involved in turf for both present and future generations.

Sincerely
Michael J. Bladon



OTS 2009. THE CHALLENGE OF GREEN.

FEBRUARY 18 & 19, 2009 • UNIVERSITY OF GUELPH • GUELPH • ONTARIO

SPORTS TURF RELATED SESSIONS

WEDNESDAY, FEBRUARY 18

1:30-2:00. W6 GTI Soccer Fields: An Irrigation and Overseeding Case Study

Peter Purvis, Guelph Turfgrass Institute. The GTI developed two “mini” soccer fields for use by adult and under-10 players for Guelph Soccer. The partnership was so successful that full-sized fields will be developed in the upcoming season. Over-seeding and irrigation research conducted during the playing season will be presented. IPM 0.66.

2:00-3:00. W7 Rainwater Harvesting

Chris Davies, Bushman Water Products Canada. Learn the current state of the world’s water supply and how it affects water in Canada. Explore the benefits, applications and uses of rainwater harvesting. IPM 1.33.

3:00-3:30. W8 Municipal Sports Field Closure Policies

Bob Kennedy, Sports Turf Management Solutions. Most Ontario municipal parks operations departments have an excellent relationship with sports communities. However, many of those same municipalities are overwhelmed by sports organizations, coaches, managers and parents who insist on using sports fields when turfgrass

is virtually unplayable due to inclement weather. This presentation explores policies that can be put in place by municipal councils to ensure that sports field usage is controlled by the municipality and not the sporting community. IPM 0.66.

THURSDAY, FEBRUARY 19

9:00-9:30. T1 Construction of the 2010 International Athletic Association Federation Athletic Field in Moncton, NB

Dr. Robert Daniels, Nova Scotia Agricultural College. The City of Moncton, New Brunswick, has been awarded the 2010 International Athletic Association Federation (IAAF) track and field games. In order to host this event, the City is required to construct a facility to meet the specifications as set out by the IAAF. Learn about specifications, planning, construction, grow-in, and maintenance of the athletic fields during the period of initiation (Winter 2008) until the Summer 2010 games.

9:30-10:30. T2 Synthetic Turf: Facts Everyone Needs to Know

Mark Nicholls, Turf Industry. This presentation debunks myths surrounding synthetic turf by looking at the advantages and disadvantages of the product. Financial justification, warranty issues, maintenance strategies, usage audit and environmental impact details are all

discussed to allow for informed decision-making.

11:00-12:00. T3 Holistic Turf Management Program for Halifax Regional Municipality

Dr. Robert Daniels, Nova Scotia Agricultural College. The Halifax Regional Municipality (HRM) sports fields are in a pesticide free zone. Turf can only be improved by using “best management practices” which excludes the use of pesticides. With an emphasis on recreational fields, a program has been developed and implemented to improve and upgrade worker skills and the condition and playability.



There are also a number of informative plenary sessions:

- Economic Profile of the Turfgrass Industry in Ontario
- Alternative Products: What Works & What Doesn't
- Cosmetic Pesticides Ban Act, 2008
- Turf Care Alternatives Round Table
- Understanding the Supervisory Role
- Water Symposium



IMPORTANT REGISTRATION DETAILS

EARLY BIRD: DECEMBER 19, 2008

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.open.uguelph.ca/ots for more details.



**SEE
DR. DANIELS
IN FEBRUARY AT
OTS 2009**



HOLISTIC TURF MANAGEMENT PROGRAM IN NOVA SCOTIA

DR. R.W. DANIELS, PROFESSOR (RETIRED), DEPARTMENT OF ENVIRONMENTAL SCIENCES, NOVA SCOTIA AGRICULTURAL COLLEGE

Continued From the Front Cover. Two other principles followed were to not get involved in personnel decisions, thus not recommending that changes be made in the number of employees involved in maintaining the fields, and to identify where efficiencies could be gained, rather than asking for increases in annual budgets. The first two years of this program have now been completed. Continuation and success of this program is due in large part to the support and efforts of Peter Verge, as during its initial phase, much groundwork had to be established, and visual results – which of course all end users wanted to see – were relatively non-existent.

Early Inspection & Trouble Shooting

Prior to recommending a program, an on-site inspection and analysis was made of representative sports fields. One problem identified initially was the existence of a thick layer of organic matter on most fields. In its effort to eliminate pesticides, HRM had embarked on a heavy topdressing program using organic materials. This practice was very much in line with HRM's mandate of being "environmentally friendly." What those who recommended this program failed to foresee was the fact that unless the topdressing was incorporated adequately into the existing soil, a "layering" of the applied

media would be created. The result of this layering was the creation of shallow rooted plants that thrived well during non-stress periods but were damaged quickly whenever any stress occurred. This problem is being addressed by implementing a multi-year program of core aeration and topdressing with a soil based material.

Component 1: Procurement

The HRM program consists of three main components: Procurement, Employee Training and Field Trials. With respect to procurement, new specifications have been written on sourcing materials and for the construction of future athletic fields. In respect to materials, HRM is now using specific turf fertilizers, etc., and all materials are tendered in large quantities to take maximum advantage of purchasing power. The establishment of new specifications for sod means that only a certain quality of product is accepted and the lowest cost price is not the determining factor in accepting a specific bid. Using the latest specifications, a new soccer field was constructed in 2008. During the construction process, the quality of materials and workmanship were closely monitored and recorded. Upon completion, all involved will meet to evaluate the process and suggest ways in which future fields can be constructed to an even higher standard.

Component 2: Employee Training

HRM has approximately 80 full time employees involved in some level of turf management. Every employee was given a three day overview of turf and its basic maintenance requirements. From this group, approximately 50 were selected for additional training. They received six days of customized classroom based education on the yearly requirements of turf establishment and maintenance. A third level of training was offered to 30 individuals who were selected and classified as "Sports Field Technicians." Their responsibilities are varied but stipulate that they become competent in identifying and providing remedial action for specific turf situations and problems as they arise. These individuals received an additional three days of classroom training. Thereafter they will be given annual updates on turfgrass management.

For each educational level, participants were given a written exam. In addition, several on-site clinics were held. These included such practical tasks as measuring a field and determining the amount of fertilizer or seed to apply in a given situation. To selected groups, field clinics on equipment calibration, infield ball groom-

Above: George Bannerman, Bannerman Ltd., conducted a one day clinic to HRM staff on equipment set-up and calibration.

ing and proper infield maintenance were offered. These clinics were presented by “experts” in their respective fields. George Bannerman, Bannerman Ltd., conducted a one day clinic on equipment set up and calibration and Ron Martin, Mar-Co Clay Products, conducted a day long clinic on baseball field layout, proper construction and seasonal maintenance of both the pitcher’s mound and batter’s box. Clinics were very “hands-on” and offered only to small groups of individuals so that maxi-

turfgrasses used on golf tees are now being established into HRM’s athletic fields.

Component 3: Field Trials

Selected fields are chosen and specific treatments applied and evaluated for a minimum of three consecutive years. This time period is necessary to adequately evaluate the effect of a given treatment. Although this is only the second year of the program, some trends are appearing and subsequent changes are being imple-

For example, less money is being spent on sod and more on overseeding. The level of appearance and playability of all fields has increased greatly during the past two years. One measurement is the increased level of satisfaction by the end users and reduction in complaints by both athletes and the general public. Staff working on the fields have now taken a greater “ownership” of individual fields and their personal level of satisfaction of working for HRM has increased.

As the program develops, individual factors limiting its success become evident. One such issue is that of seasonal mowing. Some time ago, a political decision was made to contract out mowing of all turf, including athletic fields. When this was done, standards were set with which individual contractors must comply. When establishing these criteria, no provision was made for increasing mowing frequency or maintaining individual fields at lower heights of cut to improve their playability.

Most mowing contracts are awarded on a multi-year basis and changes can only be made when an individual contract comes up for review. In the meantime, the heavier usage of fertilizers on fields and infrequent mowing result in only a limited improvement in field playability. In some instances, HRM has taken responsibility for the seasonal mowing of selected fields. It is becoming recognized that in order to have consistent acceptable quality in their highest profile fields, mowing should become the responsibility of those directly responsible for the overall

HRM employees soon realized they had much in common with the golf course industry. They both manage turf, have to answer to a demanding end user, and their efforts are not always recognized and appreciated by the general public.

mum participation by all was achieved. Individuals were then asked to provide suggestions for future clinics.

Another area of education and training occurred when individuals visited the Glen Arbour Golf Course. HRM employees soon realized they had much in common with the golf course industry. They both manage turf, have to answer to a demanding end user, and their efforts are not always recognized and appreciated by the general public. One aspect of turf maintenance they discovered in common was the similar seasonal management of heavily used athletic fields and golf tees. As a result, intensively used areas on athletic fields will be treated in a manner similar to golf tees in terms of aeration, overseeding, fertilization, etc. Specific

mented. One of the most noticeable is the use of perennial ryegrass. With our milder winters and the introduction of more winter hardy varieties of perennial ryegrass, HRM has begun to use this species intensively. The municipality has purchased precision turf overseeders and are using perennial rye in overseeding existing fields. As a direct result, they now purchase less sod and are doing more “in house” overseeding. Those classified as sports field technicians are becoming more specialized with an “overseeding” team, “fertilizing” team, “aeration” team, etc.

Conclusions to Date

In many instances, this program has not resulted in increased budget demands, but rather a reallocation of existing monies.

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seasonal maintenance of the specific fields.

Measurements of success are now evident. One example is the holding of annual outdoor concerts on the Halifax Commons. After this year's concert, extensive damage to the turf was caused by



Citadel Hill, Halifax

both traffic during event preparation and by the large audience who came to watch it. During the concert and for the following ten days, the area received continuous rain and at no time did the turf have time to dry out. The result was extensive damage to the turf and soil.

The decision was made to repair this damage in-house. This was welcomed by the employees as it provided an opportunity for them to put into practice the classroom theories that they had learned. Upon completion, they took pride in their work, ownership of the project and were able to complete all work at less cost than if it had been contracted out. As a result, HRM is considering a policy whereby in the future a portion of each concert ticket will be designated for field restorations which will be carried out by HRM employees.

In many respects, the initial phase of this program has been completed and the future will deal with the challenge of providing a consistent "high quality" turf using a minimum of inputs and no pesticides. Programs will be developed to use the most efficient fertilizers applied at strategically correct intervals to provide a continuously acceptable turf. Selective overseeding will be done at times and rates to get a maximum population of new seedlings established while suppressing the population of existing weeds. Seasonal

aeration, overseeding and mowing (frequency and heights of cut) will be incorporated into this program. As previously stated, selected fields will be maintained under a given regime for up to three years to adequately measure the results. Sports field technicians will be responsible for observing and collecting the results from individual fields. Consideration is being given to the establishment of a database whereby this information can be stored and easily retrieved to be used as a basis for modification of individual programs.

Without question, the program has been successful to the point that it will be continued. Much needs to be accomplished as additional field improvements are to be made. Principals used in the program and results obtained could be relatively easily used and integrated into similar turf management programs in other municipalities and cities throughout Canada. ♦

Editor's note: Dr. Daniels will present this topic at the 2009 Ontario Turfgrass Symposium together with the session *Construction of the 2010 International Athletic Association Federation Athletic Field in Moncton, NB.*



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FOOTBALL PLAYING SURFACE COMPONENTS MAY AFFECT LOWER EXTREMITY INJURY RISK

MARK R. VILLWOCK, ERIC G. MEYER, JOHN W. POWELL, AMY J. FOUTY, ROGER C. HAUT, MICHIGAN STATE UNIVERSITY

Injuries to the lower extremity are among the most frequent in all levels of sports and often account for more than 50% of reported injuries (Fernandez et al., 2007). While translational friction is necessary for high-level performance during any athletic contest, it is generally accepted that excessive rotational friction results in high forces being transmitted to vulnerable anatomic structures which may then precipitate ankle and knee injuries.

Although the torsional friction of shoe-surface interfaces has been documented, it has been limited by non-portable testing equipment (Cawley et al., 2006), fore-foot only cleat engagement with the surface and small compressive loads (Lambson et al., 1996; Livesay et al., 2006), and an inadequate representation of modern day artificial turfs used in football (Cawley et al., 2003; Torg et al., 1974).

In the current study, a mobile testing apparatus was developed to measure the torque produced at the shoe-surface interface on 16 surface systems. It was hypothesized that the size and structure of the infill would affect the rotational resistance of cleated shoes.

Methods

The testing method conformed to the ASTM standard method for traction characteristics of an athletic shoe-surface interface (F2333). A static compressive load of 1000 N and a dynamic 90° external rotation were applied to shoes mounted on a rigid footform.

Additionally, a compliant ankle joint was developed to better represent the *in vivo* loading at the shoe-surface interface.

Ten cleated football shoes were tested across 16 surfaces (Figure 1). Five trials were conducted on fresh sections of turf resulting in a total n=50 for each surface. Peak torques were compared for various shoe-surface interfaces with an ANOVA and SNK post-hoc tests, when appropri-

ate. An additional two-way ANOVA of the GameDay surfaces was performed to determine the effect of infill and surface fiber structure.

Results & Discussion

Peak torques were significantly affected by playing surface (Figure 2). FieldTurf and the native soil natural grass system produced significantly different torques than all other surfaces. This was in agreement with the trend in a comparable study performed by Livesay et al (2006). In the GameDay analyses, all three infills were found to be significantly different from one another. The highest torques were associated with the cryogenic SBR infill. This infill consisted of fine crumb rubber

Figure 1: Description of the test matrix.

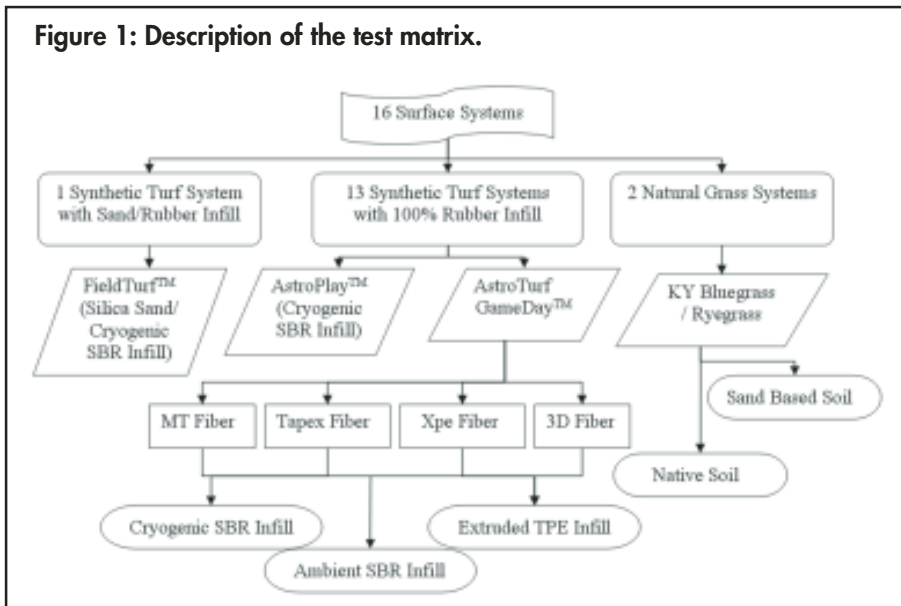
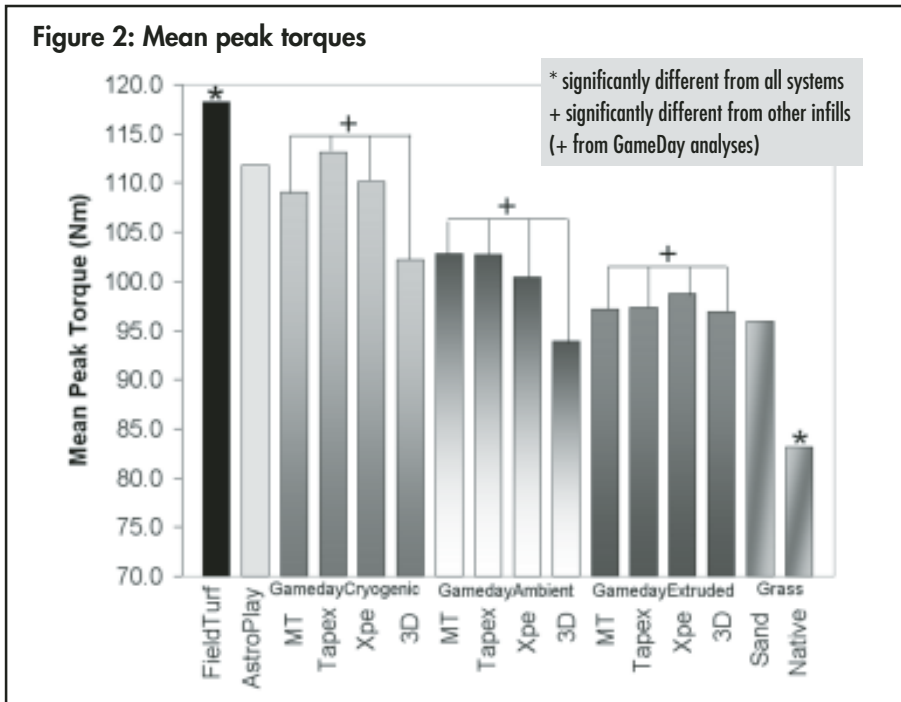


Figure 2: Mean peak torques



particles capable of packing into a dense structure thought to increase a cleated shoe's resistance to rotation. The lowest torques were associated with the extruded infill, a larger rounded cylindrical particle made of TPE, incapable of packing as tight as the cryogenically processed infill. The open structure of the extruded infill layer was thought to reduce the frictional resistance.

The GameDay analyses also indicated significant differences in peak torque for fiber structure in the GameDay 3D surface. This was the only fiber structure which consisted of a nylon root zone. The

nylon root zone leads to a reduction in the amount of infill required for a stable system, which may lower the compactness of the infill layer. This may limit cleat contact with the infill, thereby lowering the peak torque.

Similarly, the highest mean torque, seen in the FieldTurf system, may be due to the cryogenically processed rubber embedded in a fiber layout constructed with a gauge length of 3/4". The gauge length is the distance between rows of fiber on the artificial surface, and it was 3/8" on all other tested synthetic surfaces. A greater gauge length may lead to more cleat penetration

into the infill and in the case of a densely compacted infill, higher torques.

Summary & Conclusions

Generation of excessive torque at the shoe-surface interface was a factor of both the infill particle size and fiber spacing. The peak torques measured in the current study exceed injury levels based on cadaveric studies (Hirsch and Lewis, 1965). However, muscle stiffness has been shown to protect the lower extremity at similar torques (Shoemaker, 1988). Future studies using a more biofidelic ankle may help establish relationships between shoe-surface interfaces and the potential for ankle injury. Additionally, epidemiological studies of shoe and surface injury rates will be important for validating the injury risk potential of various shoe-surface interfaces. ♦

— *Proceedings of 2008 North American Congress on Biomechanics; 2008 Aug 5-9; Ann Arbor, MI. Ann Arbor, MI: American and Canadian Society of Biomechanics; 2008. Abstract nr 37. The authors can be contacted at haut@msu.edu.*

Acknowledgements

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PROACTIVE SPORTS TURF MANAGEMENT

FRANÇOIS HÉBERT, DESIGNER AND CONSULTANT, DSSS DESIGN SOLUTIONS FOR SPORTS SURFACES

I have just finished reading through the Sports Turf Association's new *Athletic Field Construction Manual (AFCM)*. Written by renowned and respected turf experts, this manual is a valuable tool that can help sports turf professionals make sense of all the varying and sometimes conflicting technical information with which they often find themselves swamped. One of the merits of this manual is that it can help initiate a fertile discussion among concerned sports turf professionals. Hopefully, it will also foster a broader exchange of their individual experiences, so that the construction classification system that is outlined can be enriched with other components and alternate approaches. These can be added to the array of tools that the industry can resort to in order to provide the public with increasingly better quality sports surfaces.

The references section of this document should not be overlooked. Here the STA has outlined the many other sources of technical information and specialized publications available – both from Canadian authors and others abroad. These resources offer alternative approaches and widen the knowledge base available to the industry in order to help us find solutions to our specific technical challenges.

The Cornerstone of Sports Field Management

Beyond the strictly technical, construction related content of this manual, I want to reflect on one section that I feel merits

closer examination. In Chapter Three, the authors address an issue referred to as “permitting.” They introduce the notion of limiting the usage to which the different sports field construction categories are subjected. Another approach to this is what can be called “specific usage capacity.” Either way, this specific notion transcends mere technical considerations and may be the beacon that signals one of the directions that the search for improved playing surfaces could explore in the future. For whatever systems are put in place, whatever techniques are adopted and whatever budgets are allotted and resources are deployed, if the playing surface is subjected to overuse or misuse, all

technical discussion is in vain and condemned to irrelevance because the desired results cannot be obtained and the surfaces are destined for deterioration.

Because of this, the very notion that sports surfaces have an inherently finite capacity to support punishment and stress is pivotal to a new approach to sports field management that ensures users have access to the field quality they desire and deserve.

Unfortunately, sports turf managers rarely have control over this specific parameter. They are usually required to provide maintenance and repairs to sports surfaces over which they have no control. Usage schedules are often devised by oth-

ers whose main priority is to provide the users with the playing time they demand. Consequently, managing within constraints imposed by usage capacity is seldom one of their preoccupations since it comes into conflict with their main mission. Also, too often, sports turf managers have had no say in the design of the sports fields they must now manage. They are stuck with poorly designed or ill adapted systems and constrained by ridiculously insufficient budgets and resources. Sports turf managers can find themselves at the receiving end of a design, construction and programming process with which they have not been involved and that has not taken their technical and budgetary limitations into account.

Each playing surface has its own capacity to sustain use, whatever the construction type, the design, or its inherent flaws. If this capacity is not exceeded and proper maintenance is provided, any

sports surface can provide adequate service – however poorly designed or badly built it is. But, the control of sports field usage is rarely left in the hands of those whose job it is to maintain surface quality. This is why it is more than urgent that a dialogue be initiated between sports turf managers and the other participants in this endeavor so that common objectives may be formulated and a coordinated plan put into motion. For this reason, the notion of usage capacity or “permitting hours” as the AFCM calls it, is to me the cornerstone of this process.

Communications in Sports Field Planning & Management

In municipalities, we often find that sports field management is a dialogue among the deaf. Users clamor for ever increasing access to sports surfaces. They pressure their elected officials, who in turn, after some resistance, comply, approve budgets and entrust technical de-

partments with the responsibility of building a new field or renovating an existing one. Once this is done, the recreation department is charged with organizing its schedules to accommodate users, which they often do with little consideration for technical issues and constraints. At the receiving end of this process, sports field managers are asked to provide maintenance and ensure acceptable surface quality.

Most often, these managers must cope with limited, if not grossly insufficient, budgets and gross overuse of the surfaces. Maintenance budgets are rarely considered at the start of the process – a situation that reflects a misunderstanding from the outset of natural sports surfaces’ inherent limits. Of course, managers end up requesting more money. They’re told that more money has not produced results in the past so why would it now? At this stage, it rarely occurs to the decision makers that results were not attained because

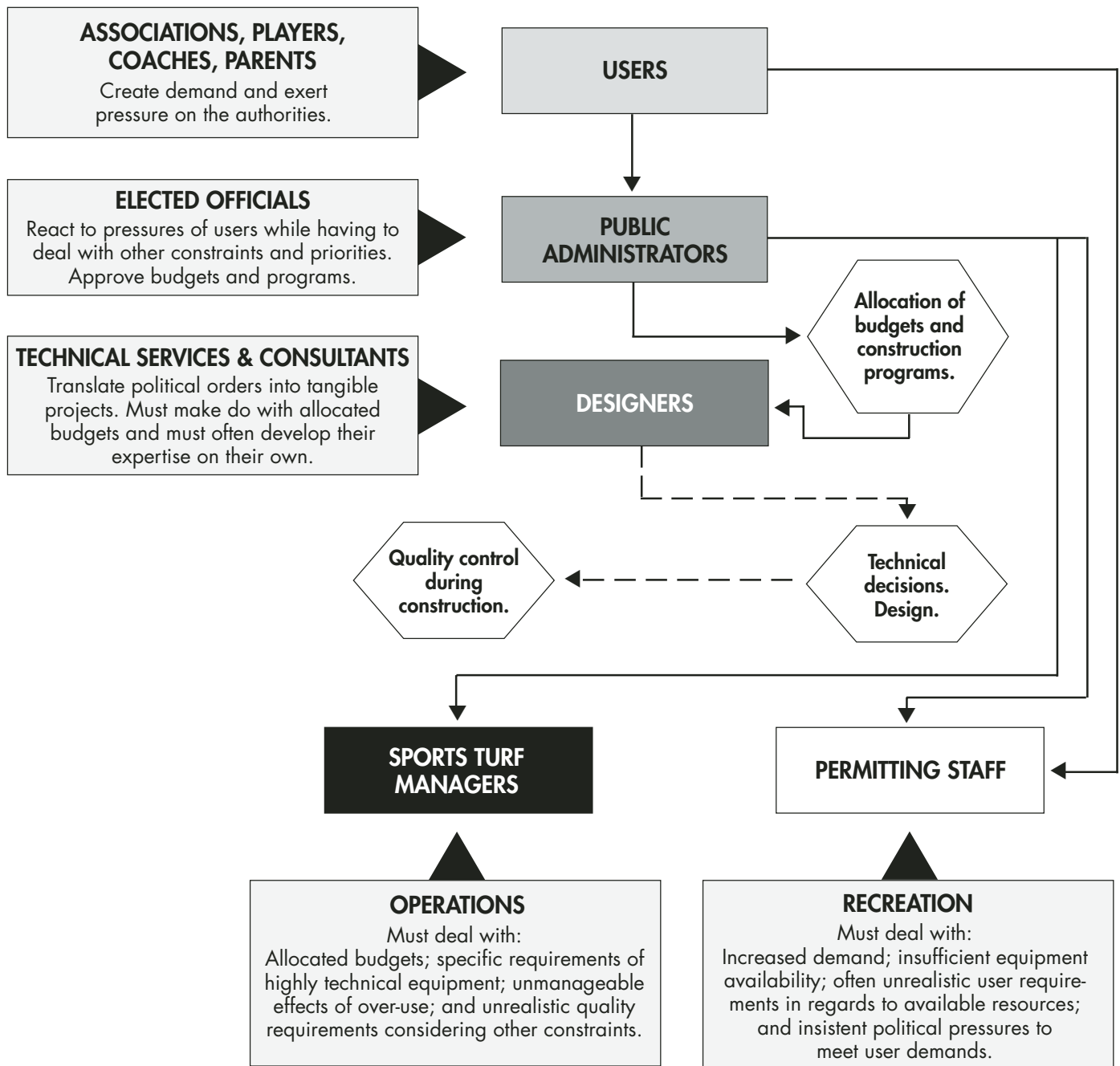
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Figure 1: The traditional linear decision-making process.



favourable conditions simply were not present.

It is ironic that the title “Sports Turf Manager” usually applies to those who are left carrying the blame for a process which is flawed from the beginning and who most often have the least influence in the planning and management process. Sports turf management is most often limited to the process of providing maintenance and repairs to surfaces. This is a profession in itself, and a very honourable one at that.

But to deprive managers of direct involvement in the aforementioned process and the setting of usage guidelines and rules can only lead to poor results. In fact, we find that the communication paths only go one way and lead to dead-ends. There is very little communication among the different parties involved. This is the root of many of the problems that plague sports field management in municipalities. That those who have the most practical knowledge are not closely involved in the deci-

sion making and design process makes no sense, and the results usually bear testimony to this.

Proactive Management Approach

Recently, I was asked what direction I thought the sports turf industry would take in the future. My initial response as a designer could have been about innovations in drainage techniques or some other new products that are appearing on the market. But instead, I replied that the future of

sports fields lies in a revolution in management approaches. The demand for sports playing surfaces has been increasing for years and municipalities have not been able to keep up with this demand. Today, economic realities are such that resources are becoming increasingly scarce while demand increases. For municipalities to surrender to this unbridled demand is no longer an option and the onus to provide quality and safe surfaces can no longer be put solely on sports turf managers.

Management must become more proactive so that overuse can be controlled. Construction types must be adapted not only to intended sports performance and user demands, but also to available maintenance resources and know-how. Usage limits must be set and management tools devised so that these limits are respected. We now live in an era of sustainable development and in the matter of sports turf management, sustainability means that poorly planned and costly municipal installations cannot continue.

There are different ways to provide players with the quality playing surfaces they demand. In an ideal world, municipalities can make more funds available in order to build enough sports fields and ensure proper maintenance. Of course, if they had the means, they probably would have done this already. Another way is to control usage in order to limit it within the overall usage capacity of the municipality's existing fields. Inevitably, this will meet with the resistance of users who will exert pressure on public administrators who in turn will pressure permitting staff to release more access time. And we find ourselves back to square one.

Alternatively, a better grasp of construction and maintenance techniques is a worthy step. In this sense, the AFCM is an important tool on which to build. In its pages we find a wealth of information. It introduces notions that can be built on to elaborate a broader view of sports turf management. The technical aspect of sports field construction and management is very important to help increase the usage capacity for the inventory of playing surfaces within the municipality. We should see this manual evolve as future editions are published. We should also probably see the appearance of synthetic

fields in the manual's recognized categories because, whether we like it or not, they are an important new tool in our arsenal and to reject them out of hand would be a mistake.

But to only rely on the technical aspects of sports field construction will not solve the problems generated by rampant overuse. The problems originate and must be managed earlier in the planning process. The equation between the demand for playing hours and usage capacity must be addressed from the outset. This is the determining factor and if the balance cannot be attained by technique, then it must be tackled by the demand side. Does this mean that demand may have to be curbed? Unfortunately, the short answer is yes.

A Communication-Based Process

Improved communication between the various parties involved is essential to ensure that the industry can provide answers to the needs of users. The users must also become an integral part of the management team and strategy because they are the ones straining the system. Common goals must be defined and consensus must be attained on the ways to reach them. To do this, communication must be established among all participants.

In a modern organization faced with tight budgetary constraints, it is unproductive for certain elements to be kept isolated from the rest. In sports turf management, administrators, designers, planners, permitting staff and users must support those entrusted with the maintenance of playing surfaces. This must be

come a joint effort aimed at a common goal. To achieve this, all must put aside their own personal interests and agendas. A clear picture of the existing situation must be drawn for all to see. Each participant must put forward his needs while his constraints and limitations are also considered.

Proactive management means that rational objectives are set and tools are formulated to meet them. For instance, if it is determined that usage limits are to be set and respected, it is futile to presume that these will immediately be adopted by users and willingly enforced by permitting staff. Usage control means that physical barriers may need to be erected. Games may need to be cancelled and playing calendars lightened or shortened to allow for seasonal maintenance operations to be conducted and the sports fields to rest between periods of intense use. We are talking here about the end of the reign of the user over a municipality's sports fields.

Just as other municipal installations and equipment is cared for so that the investment that they represent is protected, the same approach needs to be adopted with sports surfaces. For instance, it may be tempting for a municipality to build a sand based field, if only because of the image of affluence this conveys. But, to do so, the necessary maintenance budget must also be allocated and the necessary expertise developed in the maintenance staff. If not, simpler, less demanding systems need to be considered. You cannot claim to support sustainable development without such an approach.

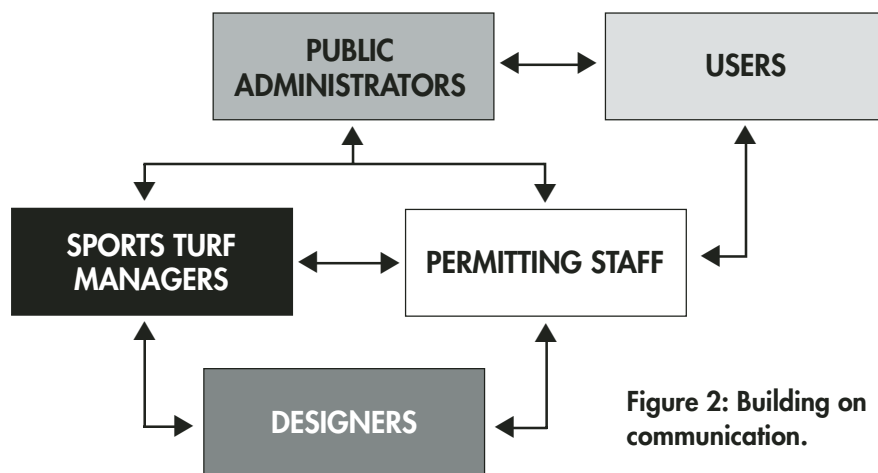
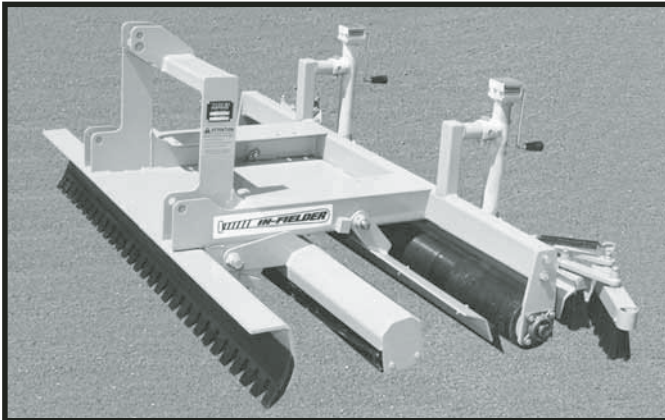


Figure 2: Building on communication.



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If available usage levels or permitting hours are insufficient to meet demand, these will need to be increased in some way or another, or usage will need to be reduced. It is all a game of give and take. In order to work, this give and take must be negotiated among involved parties and not imposed unilaterally. This is why communication is so important and consensus is essential. Without these, the fight to curb overuse will at best result in continuous confrontation between users and those

having to manage tighter budgets while their populations demand more accountability coupled with better quality services and installations. In the past, recreation departments were often asked to satisfy the needs of the users, independent of costs or consequences. Today, departments must account for their actions and produce tangible results.

Recreation is often seen as a service that affects directly the image projected by elected officials. Sports organizations con-

ficult to attain. To balance the two requires tact but also a resolute approach, one that is inclusive so as to elicit the participation and adherence of users and others to the ultimate goal which is to provide the population with quality sports surfaces.

The first edition of the Sports Turf Association's *Athletic Field Construction Manual* is a valuable contribution to the effort towards better sports surfaces for our populations. It introduces useful notions, such as "permitting hours." To clearly establish maintenance costs associated with the different construction categories is also very responsible, for it helps fight the myth that providing sports surfaces is cheap. This puts a damper on the attraction higher construction systems may have. With time, this manual could look in more detail into slit drainage and manufactured soils (sand:soil:organic material blends) as valid and useful construction components. And inevitably, I believe a chapter on synthetic turf fields will appear in these pages.

But, this manual is aimed specifically at the sports turf manager. To attain significant results, other participants will need to be invited into the discussion so that all involved can contribute to the ultimate goal of providing users with the best quality sports fields possible. ♦

— Francois Hebert can be reached at fhebert@dssconsultants.com

Long gone is the time of unlimited resources and wasteful practices. For years now, municipalities have been faced with having to manage tighter budgets while their populations demand more accountability coupled with better quality services and installations.

stuck holding the fort. This is an untenable situation.

What is described here implies that concessions may need to be made and existing practices altered. This inevitably generates resistance from those who are required to change their ways. This is why it is important that all agree from the very beginning to a set of objectives that the plan is meant to attain. Attaining those objectives is the ultimate goal, but also the ultimate prize.

Sports Field Management in the 21st Century.

Long gone is the time of unlimited resources and wasteful practices. For years now, municipalities have been faced with

stitute a powerful, well organized and very vocal lobby in municipalities and elected officials are very receptive to their demands. The pressure is transmitted directly to the recreation departments, who may be tempted to acquiesce to these demands, however disproportionate they may be.

But such an approach has a direct impact on the quality of facilities. And, as the demand for access to playing surfaces has increased, so has the sophistication of the users. Litigation is also a concern, and while safety may not have been such an issue in the past, it is now an ever present preoccupation. Because of this, neglect and inaction are no longer options.

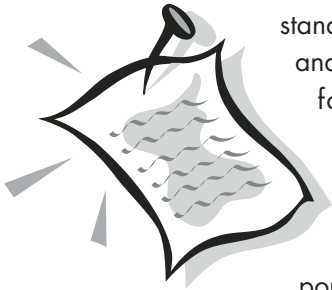
At best, the equation between demand and the quality of provided services is dif-

Above: Faced with having to curb their usage, sport enthusiasts will soon be won over when they see and experience the results that can be obtained by proactive sports turf management.

The STMA Collection of ASTM Standards for Athletic Fields

ASTM International (originally known as the American Society for Testing and Materials) is one of the largest voluntary standards development organizations in the world. It

has become a trusted source for technical standards for materials, products, systems and services, and it guides design, manufacturing and trade in the global economy.



The US based Sports Turf Managers Association (STMA), with the support of its charitable foundation, SAFE, has compiled the ASTM standards recommended for athletic field facilities into this convenient, at-a-glance collection. STMA's goal is to provide its members with information to help them produce safe, playable surfaces to maximize the performance of the field and protect athletes. These standards address important safety issues as well as testing and proper construction of athletic field surfaces.

STANDARD TEST METHODS FOR ATHLETIC FIELD ROOTZONES

Particle Size Analysis and Sand Shape Grading of Golf Course Putting Green and Sports Field Rootzone Mixes

This test method outlines laboratory procedures for analyzing the sands used in sand-based rootzones. These techniques allow individuals to determine not only sand, silt, and clay content, but the percentages of each sand fraction (i.e. coarse sand, medium sand, fine sand, etc.). *Designation: F1632-03*

Organic Matter Content of Putting Green and Sports Turf Rootzone Mixes

This test method outlines laboratory procedures for determining the amount of organic matter in a sports turf rootzone mix. *Designation: F1647-02a*

Saturated Hydraulic Conductivity, Water Retention, Porosity and Bulk Density of Putting Green and Sports Turf Rootzones

This test method outlines laboratory procedures for determining the physical properties of soils used to construct sports turf rootzones. *Designation: F1815-06*

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This proposed standard outlines proper practices to be used in the sampling and quality control testing of rootzone materials used during the construction process. The standard covers gravel, sand, organic amendments, and finish-blended rootzone mixes.

Designation: WK490

Construction of High Performance Sand-Based Rootzones for Sports Fields

This standard is to athletic fields what the USGA specifications are to golf course putting greens. The standard outlines techniques that are appropriate for the construction of sand-based sports turf rootzones. The standard provides guidance for the selection of materials including soil, sand, gravel, and peat, as well as an overview of appropriate design and construction practices. *Designation: F2396-04*

Construction and Maintenance of Skinned Areas on Baseball and Softball Fields

This standard covers techniques for constructing and maintaining skinned areas on baseball and softball fields. The standard provides guidance for selecting suitable construction materials (soil, sand, etc.). Construction techniques are outlined along with

minimum maintenance procedures, such as scarification, irrigation, and the use of conditioners. *Designation: F2107-07*

Construction and Maintenance of Warning Track Areas on Sports Fields

This standard covers techniques for constructing and maintaining warning track areas on sports fields. The standard provides guidance for selecting suitable construction materials, as well as a list of suitable construction and maintenance techniques like edging, dragging, and rolling. Synthetic warning tracks are not covered in this standard. *Designation: F2270-04*

Construction and Maintenance of Grass Tennis Courts

This standard outlines techniques that are appropriate for the construction and maintenance of grass tennis courts. The standard provides guidance for the selection of soil materials and turfgrass species to be used. *Designation: F1953-99(2003)*

Maintaining Cool Season Turfgrasses on Athletic Fields

This standard outlines the minimum requirements for maintaining cool-season turfgrass athletic fields. Practices covered include mowing, fertilization, irrigation, core cultivation, and pest management. *Designation: F2060-00(2005)*

Maintaining Warm Season Turfgrasses on Athletic Fields

This standard outlines the minimum requirements for maintain-



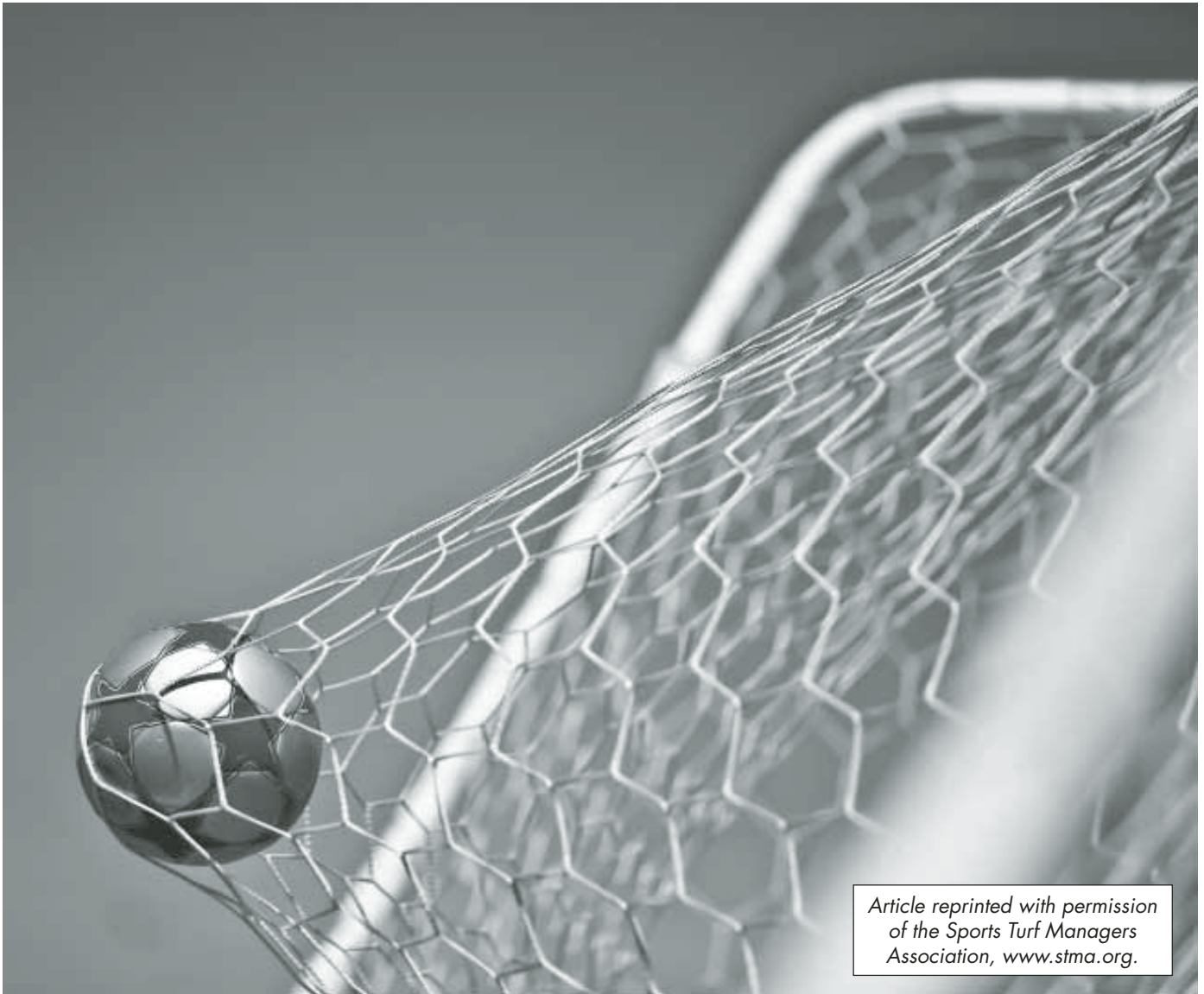
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ing warm-season turfgrass athletic fields. Practices covered include mowing, fertilization, irrigation, core cultivation, winter overseeding, and pest management. *Designation: F2269-03*

STANDARD TEST METHOD FOR PLAYING SURFACES
Measuring Shock-Attenuation Characteristics of Natural Playing Surface Systems Using Lightweight Portable Apparatus

This test method outlines procedures for measuring the hardness of athletic field playing surfaces with devices like the Clegg Soil Impact Tester. *Designation: F1702-96(2002)e1*

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Safety and Performance Specifications for Soccer Goals

This standard outlines safety and performance requirements for soccer goals. Properties such as strength, stability, and weight are discussed. *Designation: F2056-00*

Safer Use of Movable Soccer Goals

This standard discusses how to install, use, and store soccer goals of various sizes. *Designation: F1938-98(2004)*

STANDARD GUIDES FOR FENCES

Fences on Ballfields and Other Sports Facilities

This standard outlines minimum safety requirements for various types of fences used on sports fields. Appropriate installation practices are discussed as well. *Designation: F2000-06*

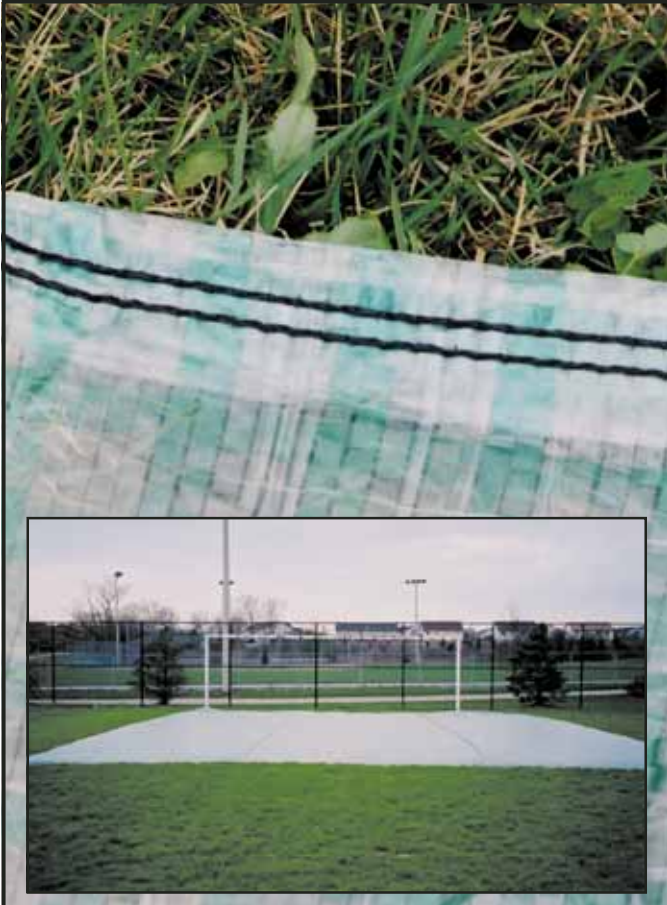
Construction of Chain-Link Tennis Court Fence

This standard covers proper techniques for constructing chain-link fencing around tennis courts. Various types of chain-link fabric and framework materials are discussed, in addition to appropriate installation procedures. *Designation: F969-07*

FULL TEXT

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