Seven Lines of Defense

Canadian project uses set of conservation techniques

By CHERYL REGO

ONTARIO, Canada — Environmental concerns ride high at the site of any golf course development, and now a developer here is using what it calls the Seven Lines of Defense to combat environmental concerns. The Seven Lines of Defense are conservation techniques that address concerns such as water runoff, loss of nutrients and leaching of pesticides.

Some of the techniques featured in the Seven Lines of Defense have already been incorporated into new golf courses, and many of the techniques are leading the industry. Two of them are particularly interesting.

- By lining the greens, tees and inlets to wetlands with klinker ash stone, a hydro-generation waste product, the developer hopes to remove additional phosphorus runoff.
- It also plans to plant a harvested species such as poplar trees in the constructed wetlands which will remove unwanted components by bio uptake.

The notion of using klinker ash on the course has an interesting start. Klinker ash is a byproduct from the coal-fired generating stations of Ontario Hydro. Hydro was looking for a way to get rid of the klinker ash, and with some research found that it could be used as bulk fill and that it attenuates and binds phosphorus.

Phosphorus is a major concern for the Lake Rosseau Beach Resort. The resort is located in the Muskoka Lakes region of the province, a watershed area of great environmental interest. Phosphorus encourages algae blooms in lakes. The idea to incorporate klinker ash stone came from Michael Michalski, a biology consultant who had done research on the ash. Experiments are now being done to determine the life span of klinker ash's phosphorus.

The future is now in maintenance building complexes

By MARK LESLIE

HARROGATE, England — Maintenance "barns" of the past are shedding that identity as modern technology, forward-thinking space planning and environmentally conscious superintendents transform their work areas into "turfcare centers," or "natural resource management centers."

That was the word from Master Greenkeeper Terry Buchen, an American who told an audience at BIGGA Turf Management Exhibition (BTME) about "Maintenance Facilities of the Future."

Indeed, parts of these facilities of the future already exist at some high-end private and public facilities in the United States. The highly traveled Buchen took bits and pieces of a number of maintenance complexes to present a composite from which greenkeepers could draw and to which they could aspire.

British & Int'l Show Review

Watschke: Expect breakthroughs in turf

By MARK LESLIE

HARROGATE, England — Fantastic advances in turfgrass breeding and genetics loom in the immediate future, but with this progress will come unheard-of challenges for greenkeepers, said Dr. Thomas Watschke of Pennsylvania State University.

"Innovations are only limited by the imagination, and believe me when I say that geneticists know how to dream," Watschke said in a talk at the BIGGA Turf Management Exhibition (BTME) here.

"Technology offers very seductive solutions. But what are the ramifications of the results?"

He was referring to one of the latest of a phenomenal string of high-tech grasses that have included one Round-up resistant bentgrass and another possible Prograss-resistant bent.
Future is now in maintenance complexes

Continued from page 25

The parameters for Buchen's modern and futuristic turf-care center for an 18-hole course include:

• "While maintenance buildings in the past were situated in the middle of the golf course, the modern way of thinking is to have them on the outside so that deliveries don't bother golfers," he said.
• The area normally needed is .81 to 1 hectare.
• The buildings range in size from 372 to 1,116 square meters.
• "The goals and objectives are to store all the maintenance equipment inside to prevent damage from the sun and moisture, and have a good environment to work on the equipment and for the employees."
• Cool-season courses will have heated and cold storage. Warm-season courses also will have heated storage, but many times they have a three-sided carport for cold storage.
• The conceptual floor plan provides for proper traffic flow — a crucial decision for the greenkeeper to decide.

The mechanic's shop of the future will range in size from 100 to 280 square meters. Its amenities will include:

✓ A hydraulic lift for riding equipment that can lift from 2,000 to 4,000 kilograms; a hydraulic lift table for smaller equipment and walk-behind mowers which is capable of lifting about 900 kilograms; workbenches that are 9 to 106 centimeters high and are topped with 6.3-mil-thick metal and which have storage space underneath.
✓ Numerous air and electrical outlets for electric and air power tools.
✓ Overhead, retractable hoses for lubrication, air and water.
✓ An overhead hoist and block and tackle.
✓ Remote control-operated garage doors that are at least 4 meters high and 4 meters wide.
✓ Skylights and excellent fluorescent lighting.
✓ A parts room with adequate shelving and excellent lighting.
✓ A heated and air-conditioned mechanic's office with a window into the shop area and sealed off so the mechanic can make phone calls in a quiet environment.
✓ Record-keeping, including a computer to keep service records, parts inventories, purchase orders, etc.; file cabinets for record keeping; and bookcase storage for service, shop and parts manuals for machinery.
✓ A grinding and sharpening area, sometimes in a separate room, that contains bedknife and reel grinders.
✓ An exhaust fan and fresh-air ventilation and a dust-collector system.
✓ A welding and acetylene torch area that contains safety curtains to protect the eyes of nearby workers; welding table with vise and storage underneath; three-phase electric outlets throughout; extension cords so welders can be mobile; exhaust fan and fresh-air ventilation; and excellent lighting.
✓ A heated- and cold-storage area for maintenance equipment, with a garage door at least 3 meters wide and 3.7 meters high.

"This is really important in new facilities," Buchen said. "There is more and more electric equipment today, and a lot more to come, so having separate outlets with separate circuit breakers is crucial."

✓ Miscellaneous storage rooms for tools, paint, course accessories, grass seed, and irrigation and drainage parts.
✓ A spray-paint booth.

Employee areas, Buchen said, will boast showers, locker rooms, kitchen, vending machines, lunch room and meeting room. The lunch room may have two to three microwave ovens, a stove and oven, toaster oven, a refrigerator or two, kitchen sink, electric drinking fountain, the crew assignment board, a large hand-washing sink, a television for audio-visual training, along with a VCR and DVD players. A pay telephone, time clock, bulletin board, rainsuit storage area and even a washer and dryer will be a standard.

Safety requirements include Right To Know wall displays with material safety data sheets; hazardous communication plan wall display; a walkout-tagout program; local, state and federal work posters; emergency telephone numbers; safety training video notebooks; and an emergency evacuation plan.

Future first aid kits will include a dehydrator, oxygen bottles, eyeglass goggles, ear plugs and safety goggles.

In the States, Spanish is becoming the unofficial second language on golf course maintenance crews, and so all safety signs are becoming bilingual, Buchen said.

New maintenance facilities of the future, Buchen said, will have:

• Soil test and disease identification rooms.
• A microscope and soil test kit.
• An irrigation technician's office with a computer irrigation controller, and irrigation system computer parts and supply inventory.
• The conceptual floor plan provides for proper traffic flow — a crucial decision for the greenkeeper to decide.
• The head greenkeeper's office with a blueprint room, daily operation record-keeping, and all the fertilizer and pesticide records. Sometimes it will be shared by the spray technician.
• A reception area fully equipped with a computer, fax machine, photocopier, telephone voice mail, paper shredder and two-way radio.
• Storage, utility and equipment closets.
• Utilities including single- or three-phase electricity, natural gas or propane for hot-water heat and furnace, domestic water, sewer, three to six telephone lines, and cable television for the Weather Channel.
• An employee car park typically with one car parking space (3 meters wide and 6.1 meters long) for each employee.
• An equipment staging area outside the maintenance building, where mechanics can check out the equipment and the employees can jump right on it to go to work in the morning.
• A trash dumpster area.
• A loading dock for lorries to unload

Decisions.

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Available in greens or fairway grades. Call your nearest Lebanon Turf Products Distributor. Or 1-800-233-0628.
This hydraulic lift has a lifting capacity of between 4,400 and 8,800 kilograms, so it can lift all maintenance equipment except the heaviest loader/backhoe tractors.

The future is now
Continued from previous page
supplies.
• A 140- to 232-square-meter pesticide and fertilizer storage and rinsate building that sometimes stands alone. It is equipped with spill containment, a 24-hour-a-day exhaust fan, fresh-air vents and explosion-proof lights. It is heated and cooled and has a fire sprinkler system because of the volatility of the pesticides.
• Fire extinguishers, emergency spill management and bilingual safety signs.
• An area next to the pesticide buildings to store spray and granular application equipment.
• Three storage tanks for rinsate to wash the pesticide and fertilizer application equipment. The tanks will range in size from 380 to 760 liters. Drainage grates and submersible pumps will ensure that all the water is reused and filtered by filters that are changed daily.
• A 93- to 232-square-meter fertilizer storage building.
• Used oil storage and rinsate equipment wash racks. Unleaded petrol and diesel fuel storage tanks, ranging in size from 1,892 to 3,785 liters, will have such safety requirements as emergency fuel shutoff switches, fire extinguishers and bilingual safety signs.
• New oil storage, in either 113- or 208-liter drums, with spill containment beneath them.
• Soil storage buildings made of brick, with sidewalls, and a roof. The floor surfaces will drain toward the front of the building, so that if any moisture does get in, it surface drains. Storage will include greens top dressing, top soil, tee and fairway top dressing soil, bunker sand, divot soil mix, mulch and bark, drainage gravel, and, in the Northern climates, road salt and calcium chloride.
• Greenhouses for in-house propagating of annual and perennial flowers, trees and shrubs, clubhouse interior plants, and turfgrass experiment plugs. Turfgrass nurseries, often at the maintenance complex, will vary in size from 140 to 465 square meters. The tee, fairway and rough nursery, often located on the golf course, will range from 465 square meters to almost half a hectare.
• "Many new facilities," Buchen added, "have turf student housing — literally small apartments that are furnished and have no cost for the employee. It actually helps the club by providing security through the employee."

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Grasses to break barriers

Continued from page 25

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Watschke spelled out the progress in other areas:

• Compaction resistance. "We spend a lot of time managing turf to resist compaction," he said. "We have wonderful tools and equipment to deal with it. Yet every time we want to do something about compaction it gets in the way of people using the facility. There are a couple of plants — knot weed and goosegrass — that have extraor-

Turfgrass breeders and gen-

Therein lies the question of ramifications of at least some of the up-and-coming turfgrasses, but others of these new breed will turn heads in a good way, he said. For instance, the bentgrass that is resistant to Roundup and the one resistant to the annual bluegrass control Prograss. And the genetically engineered rooting ability, which will be on-line by the middle of this century, "will be phenomenal," Watschke added.

Turfgrass breeders and geneticists are making progress in various arenas — from compaction resistance to wear and shade tolerance, non-thatch producers, and dwarfism, he said. Perhaps none of these, however, is as fascinating as "allelopathy," the capacity of one plant to suppress the growth of another. Most of the time this is due to roots, but sometimes from the trailers that come out of the leaves.

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tion of plant competition between one grass and another," Watschke said.

"We have clear evidence that there are certain perennial ryegrasses that suppress annual bluegrass growth. It has long been known that quack grass suppresses the growth of all other grasses," he said.

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Mike Harrison: Desert superintendent

Continued from page 37

the valley, across the moderating influence of Lake Osoyoos and into the territory to the east. Lack-
ing this topography, it can be rela-
tively balmy at the course while in
Omak, Wash., a mere 50 miles south, a major snowstorm might be in progress.

The area's popularity has re-
sulted in acres of condominiums
and private homes south of the
course, and a building boom in
the area of the town.
In addition to the water-purifi-
cation chemicals, the residents
use water softeners, Harrison
said. These use salt which add
yet more sodium to the mix.

Ruefully Harrison noted: "There
are better products out there [for
water softening] but they're more
costly by four times." The
crews cut up and removes the
tee markers daily. Bunkers are
power-raked five times a week.
Although the greens are cut daily,
Harrison has the cleanup cut done
only three times a week, explain-
ing that the compression of the
triplex mowers around the curves exacerbates the effects of the so-
dium in weakening the turf.

HORSE TRIALS
One day annually, in May, the
South Okanagan Horse Trials
come to Osoyoos G&CC. There
is a course of jumps (permanent-
ly placed) and other objects,
very large objects, that are used
on land equestrians share with
the course. On this day, the con-
figuration reverts to the original
18 holes, a process that takes six
hours to set up and another six
to reconfigure.

"Actually," Harrison grinned,
"it isn't as bad as it sounds. In fact,
I enjoy it." POSSIBLE 36 HOLES

Addition of another nine holes
is being considered at Osoyoos
G&CC.

"There are more people mov-
ing into the area, more people
coming from the States to play
here," Harrison said, perhaps
jured by the fact the Canadian
 dollar in October was worth $1.47
U.S. There are 200 privately
owned and 50 rental golf cars at
the course.

Will Harrison be up to the chal-
enge of yet another nine holes?

"Oh yes," he said enthusiastically.
"Each problem is a chal-
lenge, and really, there aren't
too many major problems that
crop up. The membership
is great. I get very little pressure. I
love living here and so do my
wife and children."!

Future grasses

Continued from previous page

- Non-thatch producers. This,
Watschke said, is a problem.

"Some of our best grasses are
thatch producers," he said. "In
this part of the world you have
a lot of fine fescues that are thatch
producers. They have seasons
in which they grow for 12
months, and yet for another pe-
riod of growth there are such
cold soil temperatures that you
have very low background-level
microbial activity. Even though
you have a pH that is adjusted
you have a pH that is adjusted
to a top dressing program, you
will get this accumulating thatch
just because of their growing
environment, coupled with lack
of microbial decomposition.

Meanwhile, scientists are try-
ing to breed cold tolerance into
warm-season turfs and heat-tol-
erance into cool-season grasses.

"Under those circumstances
the challenges will be far greater
than a lot of the other things I've
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