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 been 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-generance waste product, the developer hopes to remove additional phosphorous 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 of the coal-fired power plant. It is a byproduct of the coal-fired power plant. 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 phosphorous.

Phosphorus is a major concern for the Lake Rosseau Beach Resort. The resort is located in the Muskoika 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-abortment.

Some of the techniques featured in the Seven Lines of Defense are conservation techniques that address concerns such as water runoff, loss of nutrients and leaching of pesticides. The Seven Lines of Defense have been 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-generance waste product, the developer hopes to remove additional phosphorous 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 of the coal-fired power plant. It is a byproduct of the coal-fired power plant. 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 phosphorous.

Phosphorus is a major concern for the Lake Rosseau Beach Resort. The resort is located in the Muskoika 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-abortment.

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.

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 new high-tech grasses that have included one Round-up resistant bentgrass and another possible Round-up resistant bent.

Dr. David Huff, Watschke said, has produced a semifarm-type annual bluegrass that is superb but without seed.
**Future is now in maintenance complexes**

Continued from page 25

The parameters for Buchen’s modern and futuristic turf-care center for a 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; work-benches that are 91 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.

“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. “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 or 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 defibrillator, 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 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.
- 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.

Continued on next page
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 sidewalks, 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."

NX-PRO with Meth-Ex 40 delivers the dependable, controlled release you expect from a leading nitrogen source.

Plus, its homogeneous analysis has all the essential nutrients your turf craves. Of course, if Meth-Ex 40 isn't quite what you had in mind, we have just what you're looking for. NX-PRO with Poly-X PRO. Just take your pick. NX-PRO will do the rest.

Available in greens or fairway grades. Call your nearest Lebanon Turf Products Distributor. Or 1-800-233-0628.