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The Grass Roots

AN OFFICIAL PUBLICATION OF THE WISCONSIN GOLF COURSE SUPERINTENDENT ASSOCIATION

VOLUME 2 JUNE/JULY 1983

Cover Picture:
No. 3 Hole Alpine Valley
Jim Brady — Superintendent

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PRESIDENT'S MESSAGE

The two things in my life that I have despised most are, going to the dentist and writing articles. This is changing. Now my dentist and I are good friends and his hygenist is not exactly the girl next door, if you know what I mean. Even the writing I once avoided like the plague is now something I do willingly. What changed? Nothing. I just stopped letting the dentist and writing keep me from getting what I want done. To have good teeth I need to go to the dentist. To share my thoughts with people, I need to write, talk, whatever. Sharing ourselves is something we all must do, but we sometimes allow people and things to stop us.

The important area that all Superintendents deal with is the golf course, you know, where the game of golf gets PLAYED. This is where I feel we need to share ourselves more. Too many times changes are made to a course so that the course will conform to a minority of members. Too many times the course is changed to make the game easier. I say to you, we as Superintendents should take an active part in the way the course is maintained and any changes proposed. We and the Golf Professional must jointly position ourselves as the basis, so that the integrity of the game, and the needs of the membership are met. In fact, we must commit ourselves to the game as much as we do to the beauty of the course. This may mean saying what you feel is best for the game, not what is popular at the time. For me, it's always easier to agree with what people are saying than to stand up for the game's integrity and what's best for all the membership not just a few.

Robert G. Boltz
President, Wisconsin
Golf Course Superintendents Association

CONTROLLING STREAM BED EROSION: AN APPLICATION FOR GABIONS

by Roger Bell

A word about the author:

Roger Bell received his Bachelor of Science degree from the University of Wisconsin at Madison specializing in Turf Management. He is currently the Golf Course Superintendent at North Shore Golf Club in Menasha, Wisconsin, a position he has held for the past six years. He is married and the father of two sons.

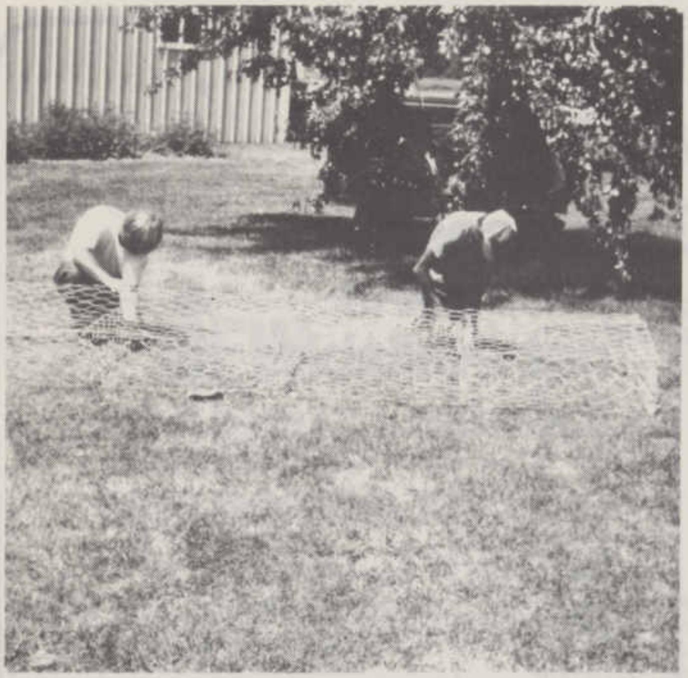
The word gabion is derived from the Latin "cavea," meaning cage. Modern day gabions fit this description well: they are compartmented rectangular containers made of hexagonal galvanized steel wire mesh filled with stones. When appropriately placed in a stream bed they are an excellent means of controlling erosion.

North Shore Golf Club is a private, 160 acre, 18 hole golf course with a small stream running through it. The stream carries run off from a 1700 acre watershed and varies from a small river with spring run-off to a mere trickle during the summer. Three of the golf cart and equipment-carrying bridges across this stream were in danger of collapse because the soil erosion in the stream bed was undercutting their support columns. The soil at North Shore can be described as heavy clay. Such a clay soil characteristically creates a 2 to 1 slope of the stream bank. (This 2 to 1 slope means that for every drop of one foot in the stream bed, two feet of the stream banks will collapse into the bed, leaving such things as bridge supports exposed.) To complicate matters, the stream bed is narrow under the bridges resulting in maximum water velocity at that point which increases the downward cutting into the stream bed.

Several solutions exist to the problem of maintaining the bridges: driven pile and plank abutments could be built or concrete abutments could be poured to reinforce the existing structures. Both these ideas were rejected, however, because (a) they were too costly, (b) they required the use of outside contractors using heavy equipment in vulnerable areas of the golf course and (c) they did not address the real problem at hand, namely, controlling the downward cutting into the stream bed.

Consultation with the U.S.D.A. Soil Conservation Service in Calumet Country and with Dr. Arthur Peterson, Soils Professor at the University of Wisconsin at Madison, confirmed the best solution would be to use gabions to stabilize the stream bed and coincidentally the bridge supports.

Gabions are purchased in two thicknesses: 12" (x 3' x 9') for the base mat and 18" (x 3' x 6' or 9') for the side walls. They come folded flat, color coded for size and require assembly into the basic cage configuration using lineman's pliers, extra large channel locks (or comparable tools) and galvanized wire (.0944"). Assembly is most easily accomplished by two persons working in a convenient location (off-site). The tops of the gabions are left not wired shut so rocks can be added once the gabions are in place. The installation of the base is most critical since it is what contains the downward cutting into the stream bed. The bottom of the stream is leveled to the desired elevation and the 12" thick assembled gabions are moved in and laid flat across the bed, all of the gabions being securely wired together. The base gabions are filled with rock and wired shut. Although the Soil Service recommends breaker run limestone (size 5" to fines) for use in filling the gabions, 3" to 6" broken concrete can be used a s well. It is wise to hand fill exposed areas for aesthetic appeal. The side foot for every 6 feet of height. These side



Assembling the gabions before transporting them to installation site.

Rock-filled gabions in place.

gabions are filled with rock and wired shut before the next layer of gabions are wired in on top and so forth, until the desired height is reached. As each layer of gabions is completed, the area behind them should be back filled and compacted. At North Shore, once the gabions were secured, new concrete pillars were poured behind the gabions to replace those that had suffered erosion damage. These pillars had steel plates installed on their tops, making it possible to weld the bridge beams to these plates.

Materials and labor for use in constructing sufficient gabions for one bridge are estimated to be: (a) approximately $1000 for gabions, (b) approximately $500 for rock, and (c) approximately 250 person-hours labor. A list of suppliers can be found at the end of this article.

The first gabions were installed and bridge re-fortification completed at North Shore in 1979. To date, the results have been excellent: the erosion of the stream has been effectively controlled, the bridge in question remains stable and the results have been esthetically acceptable to club members.

Roger C. Bell
Golf Course Superintendent
North Shore Golf Club
Menasha, Wisconsin

APPENDIX

List of Suppliers:

Terra Aqua Conservation
(most competitive bid)
4930 Energy Way
Reno, Nevada 89502
(702) 329-6262

Maccaferri Gabions, Inc.
One Lefrak City Plaza
Flushing, N.Y. 11368
(212) 736-4715

Wessel-Duval and Co., Inc.
(Charles Picarelli)
One World Trade Center
New York, N.Y. 10048
(212) 432-1940

BLACKHAWK COUNTRY CLUB IRRIGATION SYSTEM PUMPHOUSE

Planning and Construction of a New Pump Plant

John Madison, author of "Principles of Turfgrass Culture," expresses in that book his feeling that fertilizer is the most important tool of the turf manager. Dr. Madison's reputation as a competent investigator and author notwithstanding, I disagree. I suggest there is little argument that a well designed irrigation system that provides a reliable supply of quality water leads the list of all factors responsible for maintaining quality golf course turf.

Although it has been difficult to document the exact date, I've found that Blackhawk Country Club was one of the first three Clubs in Wisconsin to have watered fairways — the system was installed in 1938. The positive aspect of this is that the Club was somewhat of a pioneer in golf course irrigation at the time. The system was designed by Scotty Stewart of Chicago and, by and large, it has been functional. The negative aspect is that few improvements have been made since 1938, only repair of existing equipment when necessary. Obviously, golf course conditions changed and improved at the same time the irrigation equipment was aging. In my ten years at Blackhawk I've seen more and more time and money spent keeping the system operational. One of any Superintendent's duties is to keep the Club Officials updated and informed of current and future needs, and in 1980 the Board approved, as the first step in replacing our irrigation system, the installation of new perimeter irrigation for the greens and tees. Years of persuasion by myself had started to pay off.

The weakest link in our irrigation system now was the pumphouse. One of the pumps was manufactured by a company that has been out of business for years; one of the pumps was outside of the small building; the pressure tank had leaks in it and was on the verge of being irrepairable. The building was in gross disrepair and was incredibly small. We were spending too much money on repairs and the system was becoming much too undependable. Beyond that, even if all the equipment was brand new it would not meet our current or future requirements. Finally, because of numberous factors, it was very energy inefficient. Something had to be done and done soon. The Board of Directors decided to proceed with rebuilding the pumphouse and replacing the equipment, and planning began in mid-1981. The construction of the new pump plant was completed in May of 1982.

I suspect there are as many different pumping stations in the state as there are golf courses, and probably for good reasons. My guess is that more variables affect the pump plant than the distribution system and there aren't the manufacturers specializing in pumping stations that there are offering materials for distribution systems (e.g., Toro, Rainbird, Royal Coach, et. al.). This lack of any standardization was a factor in our decision to contract an engineering consulting firm to design a facility that met all of the conditions peculiar to our golf course, and the result of this has been a pumping station unlike any others I've seen. I'm certainly not implying that it is any better, only that it was designed and built to exactly meet our needs and conditions. I cannot put too much emphasis on my feeling that the most important thing we did in this project was hiring an experienced, reputable and quality design engineering firm; I'd be remiss if I didn't add that this was easy for us to do because the Club President was an engineer.

The engineering not only does the obvious tasks of mechanical design, equipment specifications and drawings — he also advertises for bids and supervises the bid opening, takes care of contracts and all required signatures, handles things like permits, inspections, approval of scheduled payments, determines appropriate holdbacks, approves any changes during the constructions process, schedules the work and delivery of equipment, supervises all testing requirements, assists in the start up and shakedown procedures and insures that the work proceeds according to schedule. Simply put, he makes sure the project is completed on time, within the budget and according to plan.

The role of the Superintendent is critical to the success of this kind of project. We are the ones with the local knowledge that the designer must be aware of before the design begins. More importantly, we are the ones who must work with the facility and who will depend on it as a management tool, and it should be built with our long term goals and expections in mind. I spent a substantial amount of time with the engineer before drawings began as well as throughout the construction process, and these were hours well spent.

When a Club starts a project from "scratch," whether it be a pumphouse maintenance shop, sand trap or whatever, lots of factors are considered during the planning stages. Some of the significant considerations in designing this pumphouse were:

1. Constant pressure in the distribution system.
2. Equipment that offered the use of current technology.
3. Equipment that would give us maximum return for our energy dollars.
4. A facility that met current needs as well as projected future needs.
5. Equipment with a long term useful life and with minimum maintenance requirements.
6. Equipment that could be serviced quickly and competently by local concerns.
7. Equipment that was of the highest quality (pumps, motors, controllers, valves, heavy electrical equipment, air handling equipment, pipe and pipe fittings, pressure tanks and heating equipment).
8. Built-in safeguards to protect electrical equipment for lightning, phase failure, phase reversal and drops in incoming power; to protect the distribution system from any high pressure situations; to protect pumps from low pressure (priming) problems. Also, an alarm system to notify my office, home and/or Assistant's home of a problem and nature of the problem.
9. A building that was of ample size to house the equipment, that had enough room to work on the equipment and enough floor space for additional needs in upcoming years (e.g. sand separator).
10. A building that would last one hundred years and that would aesthetically fit the site on the Lake Mendota shoreline.
11. Neat, clean and simple plumbing layout that would allow us to isolate all segments of the pump plant (pressure tanks, all pumps, check valves, etc.). Also wanted provision for initial pump priming for spring start up, easy filling of intake line back to the lake at start up or after a shutdown for repair.
12. Adequate backup capacity in case of equipment failure and the option of manual operation of the pumps.
13. A method for drawing down large quantities of water, other than through the distribution system, for testing pumps or controllers.

The order of these considerations only roughly approximates their level of importance, but the constant pressure requirements were a must. Our old pump plant accomplished this by switching pumps on and off, but the pressure variance was too great and the results were uneven distribution of water through sprinkler nozzles, gross inefficiencies in the use of electrical power (due to increased electrical consumption at each start up) and excessive wear on pumps and switch gear. Further, because of the head conditions (approximately an elevation change of two hundred feet from pumphouse to greens and tees in clubhouse proximity) the pressure dropped very quickly when a pump(s) shutoff and rose slowly once the pump(s) came on line. So the first decision that we needed to make was the method to use to accomplish our constant pressure requirement. Obviously, switching pumps on and off wasn't even considered because of our past experience. The proximity of the pumphouse relative to the golf course and the fact that we have no ponds on the course eliminated the use of an electric valve or a hydraulic valve to bleed water (i.e. pressure) off to maintain a set system pressure. Practically speaking, this left us with two choices: 1) eddy current variable speed clutch drive on one pump, or 2) variable frequency drive for one of the pumps. Although the variable frequency drive was more efficient, the initial cost was about $13,000 greater than the variable speed clutch. Since the pumping station operates for only several hours a day and for only seven months of the year, the payback period was so long that we couldn't justify the additional cost. In addition, rainfall and cool spring and fall temperatures greatly reduced the hours of use. The variable speed drive was the obvious choice for our situation.

Once the variable speed design was selected, everything else relating to pumps fell into place. The reputation of Fairbanks Morse pumps is well established and because they were sold by L.W. Allen Company, a local distributor, we knew these were the quality pumps we needed. Our experience with a Fairbanks Morse pump in the old pumphouse was a good one and made the decision even easier. Addressing the three concerns of energy efficiency, extended life of equipment and low maintenance, we felt there was a favorable cost/benefit ratio in choosing pumps and motors that turned at 1770 rpm instead of the 3600 rpm equipment previously used. Common sense dictated the need for a jockey pump to handle low volume watering — syringing, watering of flower beds and newly planted trees, specific area watering of one to three heads, etc. — and to maintain the system pressure. The impeller for the jockey pump was trimmed to meet our hydraulic conditions, handle demand of 0-100 gpm and to maintain the system pressure at 140-160 psi at the pumphouse. The engineer had experience with several manufacturers of variable speed equipment and the Allen Co. handled both Louis Allis and Eaton variable speed units. There was no significant cost differential so we looked at delivery time and chose Eaton on this basis. One of the motors in our pumphouse was a Westinghouse and again, based on our experience, past reputation and service availability, ordered the 100 horsepower motor we needed for the constant speed pump form Westinghouse. In summary, the pumping was to be handled by the following equipment:

1. Jockey pump — 3" x 2½" horizontal two stage, constant speed, split case Fairbanks Morse pump driven by a 30 hp motor with flexible couplings and enclosed guard. Capacity of 100 gpm.
2. Variable speed pump and motor — Fairbanks Morse 6" x 5" two stage variable speed horizontal split case centrifugal pump driven by an Eaton 100 hp motor with a magnetic clutch, flexible coupling and enclosed guard. Capacity of 650 gpm.
3. Constant speed pump and motor — Fairbanks Morse 6" x 5" two stage constant speed horizontal split case pump driven by a 1000 hp Westinghouse motor with flexible coupling and enclosed guard. Capacity of 550 gpm.

Demand for water up to 100 gpm is met by the jockey pump. Demand exceeding 100 gpm drops the jockey pump out and switches the variable speed unit on. The drive unit and the clutch control the impeller speed of the pump to maintain the system pressure a preset level, regardless of the number of heads in operation on the golf course. Whent he demand for water exceeds 650 gpm, the 100 hp constant speed comes on line and the varialbe speed unit slows to the level necessary to maintain the system pressure. The capacity of the constant speed and variable speed is 1200 gpm.

The importance to the control panel is equal to the pumps and motors — it is the "brain" of the system, if you will. Our controller is not a shelf item and was built to our specifications by the Consolidated Electric Co. of St. Paul. This