

Drainage, an Infrastructure Up-Grade

by Mark Luckhart, XGD Systems



Some would say that with the arid fall, winter and spring we are experiencing that proper drainage is not very important at all. In fact, probably some golf pros, general managers and greens committees may be speaking that kind of language as I write this. However, forward thinking, progressive golf facilities are possibly looking for ways to budget some unexpected money that may be becoming unleashed for some capital expenditures to further improve their course and put it in the best possible condition to perhaps be more attractive to prospective members or the golfing public in general.

When speaking of the importance

of “proper drainage” to golf courses I like to think in terms of “infrastructure upgrades”. Most of North America’s urban areas are in dire need of these upgrades to roads, bridges, sewers, water mains and the like. A large amount of this infrastructure can be 50 to 100 years old and significant advancements obviously have been made in product development and installation techniques.

I believe the same can be said for most golf facilities. Many golf courses do not hesitate to spend one to two million on irrigation system renovations and most of these upgrades are on only twenty to thirty year old irrigation systems. While I understand

this type of infrastructure spending for the golf course I can't help but ponder how often it is utilized, for instance unless a course has truly adopted the deep and infrequent watering mantra that I totally support (but few clubs really practice), I purport that the only times the irrigation heads are really used are after an aerification event and it may be a little dry and windy on their playing surfaces. Lets face it, most mid to high-end golf courses really only hand water (see popular twitter hash tag #whosgotmyhose) their putting surfaces these days which gets me to my point, if golf facilities will routinely spend this type of capital on an irrigation system, why won't they spend it on equally important infrastructure (in my

eyes anyways) like subsurface drainage upgrades?

Drainage infrastructure upgrades are generally a quarter to half the cost of an irrigation system replacement and will generally last almost twice as long as irrigation pipe, which is under constant head pressure unlike a gravity flow drainage system. But what is the value or importance of drainage? Well, the last two hot and wet summers have really solidified that non-argument. Simply put, when wet soil gets hot turfgrass roots will bake. When they bake, turfgrass roots shrink upward and when they do so the turf plant is susceptible to a host of diseases and insect infestation issues. In essence,



my take away point in this article is that well thought-out golf subsurface drainage infrastructure is the best way to get your turfgrass plant healthy enough to withstand the environmental onslaughts that Mother Nature frequently throws at you. Now before you think I am against irrigation system upgrades, I will say they are also a major player in aiding in turf health as well. Irrigation and drainage are the most important tools in a golf superintendent's arsenal to impact on positive soil moisture content, which again promotes the healthiest turfgrass plants. I believe it was Donald Ross who coined the popular phrase “ the three most important components to a successful





golf course are Drainage, Drainage and Drainage”.



Obviously, that phrase is likely well over eighty years old and one could easily argue that we are not driving around in cars from that era, so I will counter that with while that is certainly true, shouldn't careful, thorough drainage still be in the top three? Precipitation event frequency really hasn't changed. We still need to manage the excess moisture. Currently, many water challenged facilities are looking in to recycling as much course runoff as possible back to their facilities. Moving forward, this type of rainwater management will begin to be adopted by

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most if not all golf courses sooner than later. Courses who can get out in front of these planning challenges will be the facilities other courses will look to model themselves after.

One other advantage that drainage has over irrigation is the ability to warm the soil two weeks earlier in the spring (compared to undrained areas) and two weeks longer in the fall, resulting in four weeks of extra root growth per year. Subsurface drainage systems perform this by eliminating useless gravitational groundwater that keeps, the soil cooler in the early spring and late fall periods. Conversely, in the heat of the summer and during a heavy precipitation event a golf drainage system will help cool the subsoil temperature in the same way by reducing

the groundwater and introducing oxygen in to the soil profile to aid in cooling your playing surface.

The importance of proper drainage to the golf course is completely unglamorous and does not give you visual style points like showing your greens committee how you can program your irrigation head from your smart phone. I only urge you to also communicate the importance of drainage to aid in giving your facility the optimum soil moisture level needed to reduce your other agronomic inputs to a sustainable level for the long term.

XGD Systems stands for “eXisting Greens Drainage”. However, it is not limited to greens as we have always



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installed it on tees, fairways and approaches as well.

XGD was developed by TDIGolf nearly twenty years ago in southwestern Ontario. TDIGolf began as a small company installing fairway drainage systems on golf courses and sports fields in the greater Toronto area. It quickly expanded its focus as golf course restorations began to dominate its yearly sales. With our extensive farm and golf drainage background, we received several enquiries on how to revive a pushup green without rebuilding it completely. We knew how to accomplish this, but

leaving the green completely playable after the installation was our challenge. So we “guinea pigged” a few greens in the Toronto area using some rudimentary installation methods compared to today’s flawless installations, and the process was born and quickly became a hit in southwestern Ontario.

When TDIGolf moved in to the US market about fifteen years ago the “TDI greens drainage process” followed it and immediately was exposed to thousands of pushup greens in need of a greens revival. After about 10 years the “TDI process” was becoming busy enough to separate

it from the parent company and formed its own subsidiary company named XGD Systems LLC. At this time we also began to slowly expand from a single crew to our present day six crews in the busy install seasons.

So what is XGD Systems exactly? It is a subsurface piped, gravity flow drainage system installed in to the subsoil utilizing basic agricultural drainage principles. These general principles focus on gravitational groundwater control. Not unlike a farm field drainage system applied to the scale of a golf green where the agricultural crop is high value turfgrass, 2” pipe is installed on a 6’ spacing with a minimum depth of 14” across the entire putting surface. However, unlike farm drainage the trench spoils are removed and trenches are backfilled with an organic sand mixture.

This backfill is utilized mostly so that the trenches can be compacted immediately and the sod replaced, and the green is returned to play after a one day installation period. The system does not rely on the sand backfill to direct surface water to the drainage lateral as one might assume, rather it relies on lateral groundwater movement to the XGD laterals. This occurs once saturation point is reached after a heavy precipitation event and all the soil pore space is filled with useless gravitational groundwater. At this time the groundwater table is flushed and lowered to a manageable level which draws oxygen in to the soil profile previously occupied by

gravitational groundwater.

Generally speaking, I refer to the XGD System on golf greens as a major tool in a superintendent’s arsenal. We believe it is as important as irrigation to help aid in soil moisture control. XGD has been installed on over 2000 greens across North America over the last fifteen years. That is over 10 million square feet of putting surface, and doesn’t include our systematic fairway XGD installations which uses a more economical version of the greens drainage principles. One might say our fairway XGD installs are similar to a marriage of our greens drainage to the basic farm field drainage I have described earlier.

How long will XGD last? Our oldest installations are still performing strong in southwestern Ontario after 20 years time. The secret to longevity of any drainage system is positive grade on all pipes installed. This allows any silts and fines that may accumulate in a pipe to flush out after one of Mother Nature’s deluges, or after an irrigation flushing event. XGD is a major investment for any golf facility, and I have to stress that it is an investment in your highest value playing surfaces for the long term. Again, it is not a panacea for all your greens ailments, as sunlight and air movement are the other major factors, but subsurface drainage will play a great role in preserving the long term agronomic success of your finest playing surfaces for the long run.



Bio:

Mark Luckhardt

Vice President of Sales

XGD Systems LLC

772-528-5459

www.greensdrainage.com

blog.greensdrainage.com

Twitter: @xgdsystems

Twenty five years of experience in golf restoration industry. Mark helped develop and perfect TDIGolf's XGD Systems process twenty years ago. A significant part of his career has been with TDIGolf as a Senior Project Manager. As Vice President of Sales, Mark is responsible for sales and business development.

