IT'S THAT TIME OF YEAR AGAIN...

By Roger Davey

It's time to ensure that the irrigation system is ready for the next six months, and to take into account all associated aspects of its operation!

Water Source/Supply

The source/supply of water can be from either mains water supply, winter storage reservoir, summer borehole supply or emergency top-up (borehole), grey water, or treated sewage effluent.

Whatever the source, the end user must ensure that the supply is adequate and provides enough water for the areas in question. Is it also licensed and legal? Is it regularly tested for pH, N, P, K and trace elements? Is it tested for associated disease risks – ie, Weils disease/Legionella? (The risk, although slight, is obvious; warming water in pipelines or tanks breeding germs ready for atomisation and drift in front of the paying public.)

The storage areas must be adequately signed, be capable of holding the required volume of water, and be safe in its operation within the irrigation system. This all may sound obvious. But the writer has witnessed – prior to alerting the gentleman in question – undiluted hydrochloric acid being poured into a reservoir by someone standing on a plank of wood across two milk crates!)

Pumping Stations

The pump station is the heart of the system and incorrectly configured or maintained it's a death trap. Too low a flow and the sprinklers are ineffective, too low a pressure and the sprinklers are ineffective, too high a pressure (without pressure regulation in place) and the sprinklers are ineffective.

What else does the Greenkeeper come near to that operates usually at 8.0 bar pressure (80 metres), and relies on high-voltage power to work correctly? - Water, electricity and pressure – a lethal combination.

The pump station must be adequately signed, the pressure vessel safe to use/certified, a risk assessment be in place, and adequate segregation provided (8.0 bar pressure will blow a valve stem 240 feet into the air before coming down!). Therefore leaking or weeping pumps, slippery floors, poorly earthed pumps, and inadequately signed pumphouses all need to be addressed before we even look into the pump duty!

Underground Mainline

Usually manufactured from UPVC and jointed every six metres, or possibly a more modern system which should have Medium Density or High Performance polyethylene as the mainline piping materials.

Poor pressure and droplet distribution

UPVC is prone to age deterioration, typically a system over approximately 20 to 25 years old (some less than this) will suffer from leakage, which reduces pressure and reduces sprinkler performance, as well as wasting water and reducing efficiency of usage.

Underground pipelines must be sized to take into account required water flows and pressures at the sprinkler: too small a pipeline size creates a higher velocity, more friction loss, more water hammer, more joint damage and less water/pressure at the sprinkler.

To operate sprinklers effectively, friction loss and static differences have to be calculated to understand the ability of the pump to deliver the required flow and pressure at the point required.

A wet pumphouse floor needs addressing

Solenoid Valve Assemblies and Solenoid Valves

Solenoid valves should be installed within assemblies and chambers that allow easy access, are clean/free of debris, and enable manual operation of the system if required.

Many valve assemblies within ageing irrigation systems are incorrectly installed, within poorly installed chambers, with products that are prone to failure as they age-harden and corrode.

Solenoid valves should be pressure-regulating in operation, allowing the correct downstream pressure into the sprinklers preventing over-pressurisation of the droplet and subsequent wind drift. Poorly installed chambers, cracked lids, leaking or weeping or corroded valve assemblies all create a health and safety risk to both the operator and golfer, and should be repaired or replaced as soon as possible.

Poorly configured assembly with poor cable joints.

Sprinklers

All sprinklers (greens, tees, approaches, fairways) should be regularly inspected for correct operation – ie, pop-up action, nozzle performance/pressure, action in operation, radius of throw and correct retraction.

For sprinklers to achieve uniform application they must be evenly spaced, throw at least head-to-head, and be set correctly within the turf. Once this is achieved, accurate precipitation rates, and run times, can be calculated which will improve water use and efficiency and provide a more consistent turf area.

Sprinkler models and mode of operation will also play a huge part in uniformity and reliability. For example, modern sprinklers have nozzles and gear-drive units designed to higher tolerances, thus providing much higher uniformity across the area of coverage. Whereas other older sprinklers lose efficiency, have non-uniform rotation speeds, and worn nozzles. Liken the sprinkler to an engine, the older it is, the more likely it is to be inefficient, underpowered and to lose reliability.

Upgrading just the sprinkler is never the full answer as the spacing and flow to the units is as crucial as the sprinkler itself. However a faulty sprinkler that does not rotate is no good to man nor beast! While on the subject of servicing sprinklers, do you have a clearly defined staff risk assessment?!

Control System

How much water do you apply to your green/tee/fairway – eight minutes, 10 when it's really hot! Rubbish! It's millimetres we need to calculate in, millimetres per sq m per day. And it can be done (remember 1cu m of water is 220 gallons).

So, how much water do you want to apply to your green/tee/fairway today – 3mm per sq m? I have calculated the daily evapotranspiration rate, measured the sprinkler head and row spacing and checked the nozzle data, and I therefore need to run the station/sprinkler for six minutes…now that's better, we can put on exactly the amount required, can prove our efficiency and conserve water. Suddenly our abstraction licence re-application looks favourable!

An up-to-date, fully-functioning PC-based control system will allow us to do this if properly configured and used correctly – you only get out that which you put in!

Other elements associated with the control system operation, apart from programming, are usually cable-jointing and reliability. Cables will only provide reliable, trouble-free operation if jointed/installed correctly (cable as approved by the manufacturer and set into the ground correctly – ie, if in rock, sand/selected backfill used), with approved cable joints and proper jointing techniques.

And then...

Well, if all that works you are onto a winner. If not, it's time to plan the upgrade and concentrate on becoming an efficient and conscientious user of water. A planned, phased upgrade need not cost a fortune and can be undertaken over a period of years, using a design blueprint from which to work.

Designing an irrigation system is much like designing a house: get the final objective in mind – ie, greens, tee, approach irrigation – and ensure that phase one (the foundations) is installed correctly. That is, size the mainline and control system/pump station so that each subsequent phase can be added as required.

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