LEARNING OBJECTIVES

Each attendee will be able to come away with a greater understanding of the many landscape irrigation myths, and common/basic design, installation, operation and/or maintenance problems, mistakes, and oversights that are made virtually on every project that can easily waste up to 50% of all irrigation water. Attendees will also learn some items to look for when doing site observation on landscape irrigation installations.

SPEAKER BIO

David L. Wickham, ASLA, RLA, FIS, MS — He has been a student, thru full member, of ASLA for 44 years and an irrigation consultant for 40 years. He specializes in xeriphytic landscape and irrigation designs. David chaired the committee that developed the Florida statewide landscape irrigation standards and specifications that are cited/used within most municipal, county and State of Florida irrigation statutes, laws, and ordinances. He has written numerous State and National landscape irrigation, water conservation, and design articles over the last 30 years. Plus, David has spoken before numerous public and professional organizations, concerning landscape irrigation water conservation and design, over the past 3 decades.

OPENING COMMENTS

— If you could somehow correct the TWELVE most common/basic landscape irrigation design-installation-operation-maintenance mistakes, WITHIN EVERY EXISTING LANDSCAPE irrigation system throughout the US, then between 40-50% of all the water currently being used would be saved.

— At least half of everybody THAT BELIEVE they understand everything concerning all the areas of landscape irrigation (design-installation-operation-maintenance) require serious retraining and/or should never be allowed near another irrigation system within their lifetime. This includes designers, landscape architects, engineers, contractors, maintenance people, etc.

— If you use the most common landscape irrigation system water auditing method (Distribution of Uniformity – low quarter – DU-lq) to evaluate every existing landscape irrigation system throughout the U.S., then you will probably find that virtually every one of them is currently performing within a 25% to 35% efficiency range.

— If you somehow seriously think that relying SOLELY upon the current programming of the available computer irrigation design programs to create a very efficient irrigation design system, THEN, YOU REALLY NEED TO THINK AGAIN. (All of these programs assume that the user of their program understands all the applicable and relevant irrigation concepts to recognize their program’s inherent irrigation design shortcomings/problems.)
DEBUNKING MYTHS ABOUT IRRIGATION HISTORICAL WITHIN THE U.S.

— Although there are some earlier, un-verified, references throughout North, Central and South Americas, going back through antiquity, the oldest verifiable flood and furrow agricultural irrigation within the U.S. goes back at least 2200 to 2500 years ago to the Hohokum Indians in southern Arizona and California.

— Modern overhead agricultural irrigation (called man made rain back then) started several decades before the start of the US Civil War when steam powered pumps started being used for agricultural irrigation purposes.

— The use of totally underground, and pop-up, irrigation systems for landscape irrigation purposes within the US started somewhere around 1890 to 1910.

— Micro/drip irrigation in the US goes back to when Dr. Lester Keller developed a drip/micro/low-volume irrigation system for avocado groves in California, and then later, presented his work at a symposium in Riverside, CA in 1917.

— The use of reclaimed/reuse water, for agricultural purposes within the US, goes back well before any white man ever set foot in North, Central or South America.

— Wastewater, reuse and/or recycling (called sewage farming back then) started in Great Britain somewhere around 1800. In the 1870's urban sewage was being treated and used for agricultural irrigation within the U.S.

SOME ITEMS TO REMEMBER TO IMPROVE YOUR IRRIGATION SYSTEM DESIGN, INSTALLATION, OPERATION, MAINTENANCE & SITE OBSERVATION, and/or, TO EVALUATE AN IRRIGATION CONSULTANTS WORK.

— Still the most commonly violated item within any landscape irrigation system (design-installation-operation-maintenance) is to never put different types of landscape irrigation devices on the same irrigation zone to operate at the same time. (i.e.-- rotors, sprays, bubblers, micro-spray, micro-irrigation, etc. devices.) Also, do not install similar types of devices (rotors, sprays, etc.) by different manufacturers on the same irrigation zone to operate at the time.

— A very rough, un-calculated, rule of thumb you can use in field/site observations, is that controller settings of running/operating times for spray irrigation zones should be set at least 1/4 to 1/6 th of the running/operating times for rotor zones within the same irrigation system. (i.e. — If a irrigation system rotor irrigation zone is set to run/operate at 30 minutes, then a spray irrigation zone within the same irrigation system should roughly run/operate somewhere around 5 to 8 minutes to apply the same amount of water to the landscape.)

— Using either the total area method and/or single row method for calculating any zone running/operating time is definitely a far superior method for calculating zone running/operating times versus using a manufacturer’s published individual head/nozzle method. (Note -- Most computer generated/running/operating times for irrigation zones have inherent errors.)

— You should contact various local professional/regional/college departments--organizations to
get their recommended additional amounts of seasonally/weekly/monthly irrigation water to be applied to your local installed grasses, plants, et al. above their ET (evapo-transpiration rate) to keep them seasonally/weekly/monthly healthy. (i.e. -- This will assist you in your controller zone running times, as well as, within your system design, installation, operation, maintenance & site observation work.)

— Over time, you will be definitely eroding the inside of any PVC or PE irrigation piping, fittings or devices if you exceed a 5 feet per second (fps) when designing the water velocity within any irrigation system. (As many old irrigation books, etc. advise that you can use up to 8 feet per second design water velocity within an irrigation system — only if you are using steel, aluminum, copper or iron piping/fittings.)

— A 4-5 PSI or more loss through any irrigation remote control valve should be avoided. If you require a higher water pressure loss through any irrigation remote control valve, then you need to use some type of pressure regulation device in/on the irrigation remote control valve. (Note ---- Never/ever use a remote control valve’s flow control for pressure regulation. If you do, you will definitely create short and long term maintenance problems within that valve.)

— Within any residential and/or commercial irrigation system, never exceed 75% to 80% of a water meter’s or backflow preventers maximum rated gallonage/volume/capacity when designing any irrigation system. (Doing so can create other operating and maintenance problems, as well as, could cause poor/erroneous water meter readings and charges.)

— No matter whatever you, your irrigation consultant, an irrigation contractor, and/or, you see on a site observation, always maintain a minimum of head-to-head spacing/coverage within any spray and rotor landscape or agricultural irrigation zones. (If you or anyone ever stretch head-to-head spacing/coverage – you will definitely create water and money wastage. Even by a 1-2 foot of stretched spacing.)

— Despite the type of spray/rotor/micro irrigation head/device used within any irrigation zone on slopes, always separate the top, middle, bottom parts of any irrigation zone on a project site slopes to compensate for a system’s hydraulic/pressure slope issues and water wastage.

— When you design, install, or operate landscape irrigation zones around buildings, whenever possible, try to combine northern and eastern irrigation zone exposures together, and, southern and western irrigation zone exposures together. (This will reduce some hidden overwatering issues due to sun/heat exposures.)

— Don’t use more than one manufacturer’s type of spray and/or rotor heads within any irrigation zone during installation and/or maintenance operations. That is, unless you have seriously done the appropriate legal/technical research concerning compatibility before hand. (If you haven’t, then you could be wasting somewhere between 5% to 20% of the water being applied.)

— On larger irrigation systems (more than 6-8 zones), an irrigation designer or consultant should consider installing an isolation (gate or ball) valve immediately upstream of every single remote control valve (and/or installed gang of valves) to reduce future operation/maintenance costs, water wastage, and other issues. These installed isolation valves will assist maintenance workers when they need to work on an individual irrigation zone.

— Spray and rotor heads installed at ground level should always have an appropriately sized/length swing joint or flex piping play installed between them and the buried lateral
irrigation piping. During site observations, spot checking of this item should be done. (*Never allow a designer, contractor or maintenance person to hard pipe/plumb ground level installed spray or rotor heads to lateral irrigation piping without some protective play within swing joints or flex piping.*)

— Every irrigation designer/consultant should **always** calculate every irrigation zone’s pressure losses from each irrigation zone’s farthest head back to the point of connection (*not to just downstream of the zone valve*). This calculation should be through all of the lateral and mainline piping, remote control valve, backflow preventers, etal. to get an accurate pressure loss for each zone. If you do this for every irrigation zone, it will point out various problems within most irrigation system/zone designs. (*Note --- To assist you in recognizing these hidden problems, you should require any irrigation system designer or consultant to provide a detailed schedule on the irrigation plan indicating the minimum required zone pressure and zone components for each irrigation zone. Moreover, this can assist the contractor in bidding, and, you in the field when doing site observation.*)

— What most irrigation manufactures currently publish as a matched precipitation rate (MPR) for spray nozzles have a 7%+/− to 10% +/- gallonage application rate range. This means that most manufacturers MPR spray nozzles have a 15% to 20% differential gallonage spread/range, and, they still consider them as MPR. (*Question ---- Do you think that the IRS would let you pay your taxes if they were within a 7% to 10% +/- range ? ?*) Watch this very carefully within any irrigation system design, this can easily mean over/under watering of particular areas within any irrigaiton zone and throughout your project. *Historical note --- The earliest definition most irrigation manufacturers used for MPR for spray nozzles was --- if their spray nozzles were within a 25% +/- application rate range (that is a wide 50% application rate differential/range) then they were considered MPR.*

— When you are, and/or your computer is, designing/considering using MPR for rotor heads/nozzles, it definitely does not mean that you use the same gallonage rotor nozzles for ever rotor head within that zone, or, other zones. The gallonage for different rotor nozzles of different arcs needs to be changed in each rotor head to achieve MPR. Doing MPR for rotors nozzles is definitely not rocket science. Each zones rotor nozzles gallonage has to be roughly in direct proportion to the arc covered to get MPR. (*This means that a 90 degree rotor head nozzle should apply roughly half the gallonage as a 180 degree rotor head nozzle operating within the same irrigation zone.*) As a site observation note ---- Whenever you review any installed rotor irrigation zones with different arcs (45, 60, 90, 120, 180, 270, etal arcs), if you observe that any of the nozzle/head irrigation streams visually look exactly the same ---- then most of the time the irrigation/landscape contractor did not take the time to install the correct/specified rotor nozzles which will waste water and money during the system operation, as well as, create other system hydraulic problems.

— Smart irrigation designers and computer programs never exceed a maximum 10% to 15% pressure differential between the farthest spray or rotor irrigation head and the closest head within a zone to the remote control valve. (*Exceeding this pressure differential amount can produce multiple internal zone application rate problems, water wastage and/or other long term operation and maintenance issues.*) When doing site observation of spray irrigation zones, if you see the heads closest to the zone valve are misting/atomizing, then this pressure differential has been violated and spray pressure regulating bodies should/need to be installed to prevent water wastage. If you observe a similar thing happening within a rotor zone, then you should consider having various types of internal, and/or external below the head, pressure regulating devices for each rotor body installed to prevent water wastage.
— Never-ever use the simple phrase “or equal” within any of your irrigation design plans. You should always use the more legally correct terminology of “or approved equal”. I can not stress upon you the legal problems and/or lawsuit payments you can encounter if you don’t change your terminology as mentioned above. (Moreover --- Whenever many irrigation contractors ask for an ‘or equal’ irrigation product change, roughly half the time their requested product change is not an ‘or equal’.)

— When doing field/site observation, take a shovel along with you. Periodically dig up and expose lateral and mainline piping in various areas around the site to make sure the specified size and class/schedule was installed. Many disreputable (low bidding) irrigation contractors like bury their system changes without your knowledge that can get you legally in trouble. (Also, dig up and cross check, whether the whether the specified burial depths, type of swing joints, individual head pressure regulation device, etal. were followed within the irrigation plan specifications.) Sidebar note ---- The better landscape and/or irrigation contractors really don’t mind you digging up/observing their irrigation installations. Only the landscape and/or irrigation contractors cutting installation corners don’t like you to do this, because they know you will find out how they deviated from the irrigation plans and specifications.

— To help reduce project construction/installation costs, try to design all irrigation system piping layouts to utilize the common trenching method of laterals, mainlines, and system wiring. (This technically means burying mainlines below lateral lines within a common trench to protect mainlines from damage. Also, similarly bury all wiring below either lateral or mainlines within a common trench to protect the system wiring from any digging damage.)

— Whatever species of grass or groundcover used within your area of the U.S., always use an installed spray, rotor, or micro body pop-up height that is at least 1.5 to 2 times the mowed/maintained height of the grass, as well as, maintained height of ground covers and surrounding plant material. This will ensure under most cases that most landscape irrigation nozzles will not be blocked. (Please be aware of this — When doing your site observation, many landscape and/or irrigation contractors try to save on their installation costs by installing shorter body pop-up heights than specified on the plans.)

— If you contract out your site/project irrigation system designs to an irrigation consultant, and they don’t ask you up front before preparing the irrigation system design plan that they need a copy of the site soils/water table report, a copy of your landscape plan, a copy of your grading plan and a what is the expected available irrigation water supply size/pressure — then you really should consider finding another irrigation system design consultant. (Think about it, without any of this information – how can they or their computer irrigation design program consider any and all of the site factors they really need to prepare an efficient irrigation system for your site/project without wasting water and your clients operational and maintenance money.)

— When providing irrigation sleeving/piping under/along/around a roadway, driveway, median, etc., always size the sleeving so that irrigation wiring can be placed within a separate irrigation sleeve within the underground system piping sleeve. If not, then provide a separate sleeve for the irrigation wiring separate from the irrigation system piping sleeve. (Doing is this way, the irrigation piping within the sleeve can not and will not abrade and short circuit the irrigation wiring within the same sleeve.) Moreover, if it is a newly designed/installed irrigation sleeving, field observe/inspect it to make sure that any/all sleeving is being installed well below the base of any roadway, etc. (This is why you do project site observations with a shovel in hand.)