

The History of Golf Course Irrigation

By Dr. Kent W. Kurtz
California Polytechnic University

Similar to other turfgrass innovations, irrigation emerged as an adjunct to the management of golf courses. Many golf courses used mule-drawn water wagons to irrigate golf course turfgrass around the 1850s. The practice of watering putting surfaces originated in Scotland in the 1880s. By 1894, St. Andrews in Scotland had sunk a well for this purpose.

An unusual gear-driven full- or semi-circle sprinkler was invented by Orten Englehardt circa 1930. In 1897, the Twin Comet Lawn Sprinkler, developed by the E. Stebbins Manufacturing Company in Springfield, Mass., was placed on the market. This was one of the first gear-driven lawn sprinklers to be mass produced in the United States.

Pioneers of the Early 1900s

One of the first inventors to obtain a patent for a sprinkling system was Charles Skinner of Troy, Ohio. He developed a system of galvanized piping with holes spaced two feet apart to water large areas. In 1904, John Ross of Pasadena, Calif., was the first to manufacture sprinkler heads for lawn and garden use. L.B. Harris invented one of the first gear driven sprinkler heads, the "Harris Precipitator" in 1910. Another pioneer, W. Van Thompson, founded the Thompson Manufacturing Company in Pasadena in 1907. By 1915, the Thompson revolving arm roller sprinkler was being used on golf greens and at the Los Angeles CC in 1918. This was also one of the first clubs to install pipe and quick-coupler valves around WW I. Another early pioneer, L.R. Nelson, the oldest, continuous, single-family owned irrigation business, developed

a sprinkler for turf in 1906. Nelson is credited with the development of one of the early large traveling sprinklers. Nelson worked with the B.F. Goodrich Company to develop a five-inch hose that could be dragged along to work with the sprinkler. George Moody developed the automatic sequencing, hydraulic controller in 1922. This was a major development and greatly influenced the creation of automatic sprinkler irrigation, which is a large industry today. Another individual, W.A. Buckner, developed the first slow-rotating, hoseless sprinkler irrigation system. One was installed at Pebble Beach GC in 1912. Buckner further developed the quick-coupling valve, the sand resistant bearing, and the cam-driven sprinkler head. The Buckner name lives today in Fresno, Calif., under the name, "Buckner by Storm."

Pop-up sprinklers represent an important advancement in irrigation technology. John Brooks designed a brass pop-up turf sprinkler in 1916. By 1926, he had developed an electric timer that activated a hydraulic controller. When combined with the sprinkler heads, the clock made automatic irrigation a reality. By the 1930s, pop-up sprinklers made of brass were quite common. These were fixed-spray heads and were made of brass due to the metal's resistance to corrosion. In the Midwest, two brothers, Daniel and Bernard Wright of Chicago, combined their business with the Mueller Brass Company of Port Huron, Mich., to form an enterprise known as Muellermist. The company offered a complete underground turf sprinkler irrigation system with a ball-drive pop-up head as early as 1932.

Some of the earliest golf courses to

install irrigation systems in the United States were Long Island's National Golf Links, the Merion Golf Club, and Pinehurst. When the game of golf spread West, golf course architects realized that without irrigation, building and maintaining courses was impossible.

The Great Depression Years

When the Great Depression disabled businesses throughout the country in the early 1930s, the irrigation industry continued to make many technological advancements.

The Rainbird Company was being launched in Glendora, Calif., during this period by Orten Englehardt and Clement LeFetra. Englehardt had experimented with two types of sprinkler heads: the gear drive, which he attempted to construct, and the vertical impact drive. Finally, he turned his attention toward a horizontal impact-drive sprinkler. Englehardt produced the prototype in 1932, and the patent was issued in 1934. Englehardt revolutionized landscape irrigation in the 1930s with his invention. This innovative design had fewer moving parts than most other sprinklers of the time, and they were more dependable and less expensive.

By 1935, Englehardt wanted to return to farming, so LeFetra and his wife, Mary Elizabeth, assumed the manufacturing and sales rights to Englehardt's invention. The Rainbird tradition had begun. One of the first turf customers for Rainbird was the Los Angeles Country Club. By the end of World War II, Rainbird was recognized as an industry leader.

(Continued on Page 15)

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1997 National 68" Triplex Mower Electric Start. 1,073 hrs. - \$800 or best offer. Jacobsen complete 5-gang mower plus two extra cutting units. Ground driven, 6-blade reels. Good condition. Excellent reel stock. \$900 or best offer.
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or Tom Lundgren
Katehaven GC
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Spring Hill Golf Club
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mayflocc@prairie.lakes.com

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6 Smooth Rollers for Toro 27" reels (61-0410), used for 200 hrs. at grow-in - \$60 ea. 5 Smooth Rollers for Toro 1000 used at grow-in (52-3170) - \$40 ea. Kushlan Mixer used for coloring sand - best offer. 1 Toro Proline 44" self-propelled mower \$1,500. 1 Nutrient Injection System from Turf Feeding Systems - \$1,500 2 1,000 gallon fertigation tanks - \$250.
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2001 Jacobsen Tri-King 1900D diesel, 292 hours, 3wd, excellent condition \$14,500.
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1-Toro VT4000 Central Irrigation Controller \$2,000. 14-Toro VT12 Electro-Mechanical Irr. Satellites \$100/ea. 40 hp Jacuzzi Centrifugal Pump (230 v) w/Starter. 20 hp Berkeley Centrifugal Pump (230 v) w/Starter. Pump Control Panel w/Pressure Switches. 4" Cla-Valve, Y-Strainer, Check Valves, Fittings, Pipe, Etc. Buy Everything for \$4,500 Pump station and control system was installed in 1990.
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1990 7-Blade Toro Fairway Mower 450-D Unit sharpened and ready-to-go - \$6,000 or best offer. 7-gang Spartan Rough Mowers + frame, sharpened and ready-to-go.
Contact: MARK BOONSTRA
Hollydale Golf
763-559-4458

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1980 Cushman Truckster, runs good \$1,000. 15' 3 pt. Sprayer, 100 gal. tank. Never used \$ 1,500. 15' skid sprayer, 150 gal. tank, Used 2 seasons \$1,000. 76" National Triplex, Ready to cut \$750. (2) E-Z-Go work carts ~ \$700 ea. Toro Spartan gang mower \$1,000
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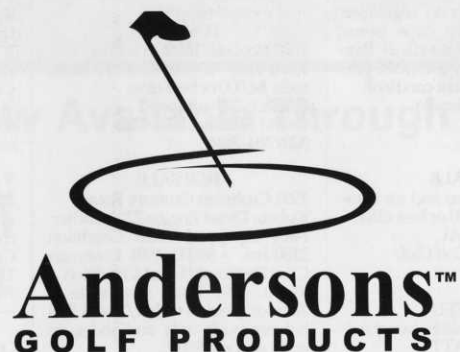
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History of Golf Course Irrigation—

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Post World War II

Once the Second World War ended, outdoor recreation and golf accelerated. The turfgrass irrigation industry boomed, since grass on all natural playing surfaces had to be watered. Completely automatic irrigation systems were available after the war, but converting quick-coupler systems did not gain momentum until the 1960s and 1970s.

A Collection of Early Buckner Sprinklers

One of the first country clubs to employ a fully-automatic irrigation system in California was Brentwood Country Club in Los Angeles in the early 1950s. Brentwood achieved wall-to-wall coverage using Buckner sprinkler heads and valves and Moody controllers. The entire 18-hole system cost Brentwood \$120,000. The post-war era was also a time for independent inventors and skilled craftsmen. The primary companies that occupied a good share of the turf and golf course market were Febc, Buckner, and Rainbird.

Hunter By this time, the full impact on the market by the irrigation industry had not been seen. In Riverside, Calif., L.J. Hunter founded the Hunter Engineering Company. Along with his two sons, Edwin and Joe, he began making tubing for portable sprinklers. In 1952, Edwin founded Moist-O-Matic in Riverside to commercialize soil moisture sensors. But in a very short time, Edwin's inventiveness resulted in the development of a smaller diameter sprinkler head to compete with the standard impact type head that had the greatest share of the market. Hunter's invention was a gear-driven, slow-rotating, plastic pop-up head which exhibited great reliability and uniform applications of water.

Edwin Hunter became a prolific inventor and also developed the valve-in-head sprinkler. Before his death in the 1990s, he held over 60 irrigation patents. In 1962, Hunter sold his business to the Toro

Company and continued his career as an employee of Toro. But in the late 1970s, he decided to leave Toro to pursue other interests. Hunter, always the innovator, formed a new company in 1980 – Hunter Industries, which has since grown to become a full-service line supplier to the irrigation industry. He began producing and marketing plastic gear-driven sprinkler heads. Most recently, Hunter Industries began manufacturing a computerized irrigation controller and other gear-driven sprinklers for the golf market.

The Toro Company After the Toro Company purchased

(Continued on Page 22)

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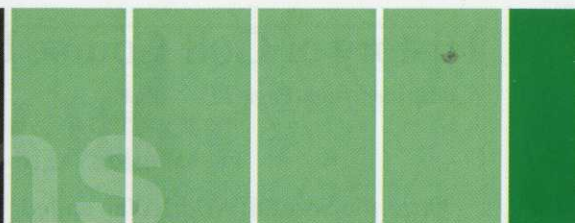
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Water Repellent Soils—

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conditions, the superintendent now has to manage water in a very shallow soil profile. Management of water in shallow root profiles places a premium on the uniformity of the water applied. Remembering both uniformity and penetration of water is critical.

One management tool available to the superintendent is the effective use of soil surfactants. Remembering that water repellency is progressive is the key. Choosing soil surfactants that provide unique hydration patterns and proper penetration characteristics will allow the superintendent to effectively manage water repellent soils, therefore LDS. There are four strategy possibilities when using soil surfactants.

Soil Surfactants should give both water penetration benefits and hydration benefits. Remember the biggest challenge in management of water repellency is providing hydration sites in the soil profile. The superintendent wants to be able to uniformly wet the soil profile to successfully manage LDS conditions.

Superintendents when choosing soil surfactants may want to ask the following two questions. After answering the two questions the superintendent then can choose the

appropriate product strategy that will best fit his or her needs.

1) Where on the golf course are the water repellent conditions? Are the greens, tees, fairways, mounds or bunker faces the biggest challenges?

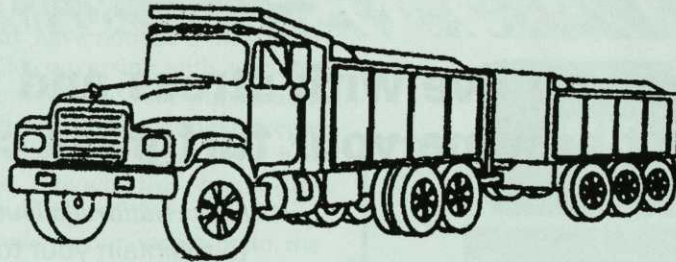
2) How does the superintendent want to manage the challenges of water repellency?

Long Term Preventative - Prevention products that generally last for an excess of 30 days. Long-term soil surfactants can be used on fairways and greens. If a superintendent only wants to spray every 3 to 4 months, long term products can be useful.

30 - Day Prevention - 30-day prevention products generally provide the best overall management of water repellency conditions.

Treatment Strategy - Superintendents can manage effectively LDS conditions under a treatment strategy of waiting until the LDS appear or start to appear. When wilting or discoloration appears a treatment is applied to give relief. Generally treatment products only last a few days and need to be reapplied.

Injection strategy - Soil surfactants can be applied through irrigation systems. Soil surfactants applied in this manner will provide relief to large brown out areas on the golf course safely and economically. Injection strategy will assist in reducing the amount of applied water required.



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