Soil Moisture Probes Being Tested at Siebel Golf Training Complex

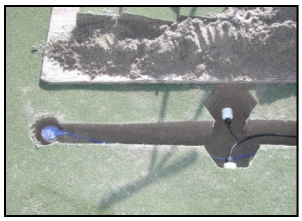
Three soil moisture probes were installed in 2009. In May 2011, a water storage tank was in stalled to boost water pressure and allow the superintendent to adjust irrigation schedules daily using the data from the probes. Between May – October 2011, the Siebel complex used less water than in the same period in 2010.[1] 220,000 gallon reduction in water use may also be attributed to differences in weather conditions between 2011 and 2010.

Information about the Probes and Project

- Three stations were installed in the fairway, tee box, and putting green areas.
- One central computer transmits data electronically (via router, see picture on left) from all three probes, sends it to the golf course superintendent's computer.[2]
- Probes save water by using soil moisture and root zone data to target the right amount of irrigation for healthy grass.

315,000 gallon water storage tank

How the Soil Moisture Probes Work

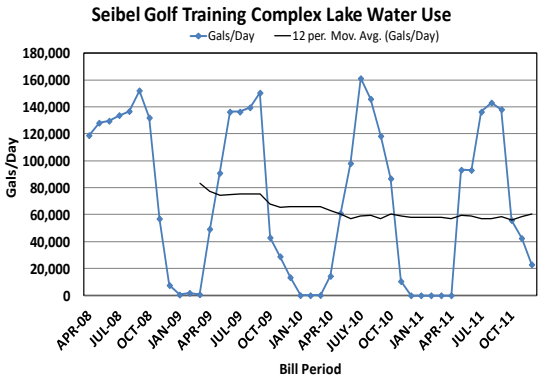


- Soil probes do not automatically adjust irrigation run times, instead given the soil type, the probes have sensors that measure soil moisture, temperature and salinity.[3] The soil probe data is used primarily during the dry season when water is depleted from the root zone at a faster rate compared to Spring/Winter.[2]

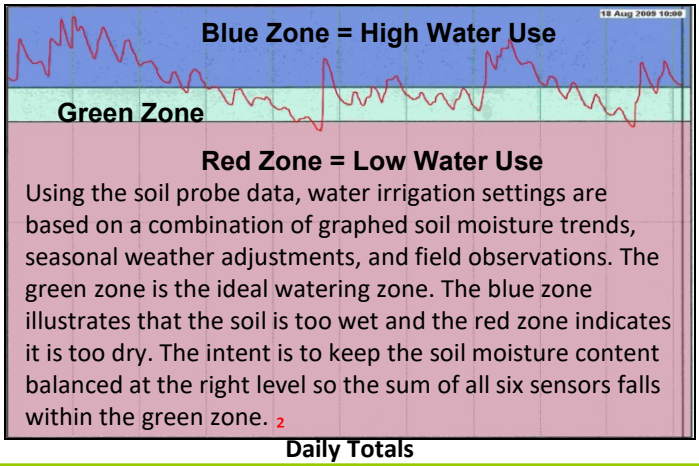
- The probe installed in the putting green contains an additional sensor for salinity. The salinity sensor indicates salt concentrations so that pre-set thresholds are not exceeded and a specific amount of water is applied to leach harmful salts from the root zone.[2]

- Sensor readings are provided at 2" depth intervals down to 12" for a total of six sensors per soil probe. This provides a vertical "x-ray" of the soil moisture and indicates irrigation penetration and water use.[2]

Water Use and Soil Probe Data



Note: Siebel Facility was not metered separately between 11/3/10 and 4/12/11. During that period the Siebel irrigation water use was on the same meter as the main Golf Course.



Using the soil probe data, water irrigation settings are based on a combination of graphed soil moisture trends, seasonal weather adjustments, and field observations. The green zone is the ideal watering zone. The blue zone illustrates that the soil is too wet and the red zone indicates it is too dry. The intent is to keep the soil moisture content balanced at the right level so the sum of all six sensors falls within the green zone.[2]

Sources: [1] Utilities metered data. Water tank installed May 2011. Calculated by comparing May through October 2010 vs. same months for 2011.
[2] Conversation with Stanford University Golf Course Superintendant Ken Williams, March 13, 2009 and August 18, 2009.
[3] US Bureau of Reclamation, "Weather and Soil Moisture Based Landscape Irrigation Scheduling Devices", Second Edition August 2007.

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