

A big splash in savings

New water pre-treatment process reduces costs and conserves water

By Kathleen Spicer

At a Boeing building in Kent, Wash., nine cooling towers can support the production of 23,000 gallons (87,000 liters) per minute of chilled water that is used to support critical heating, ventilation and air-conditioning systems.

A conservation initiative by Site Services of Shared Services Group is expected to save 7.6 million gallons (28.9 million liters) a year there, plus eliminate harmful chemicals and significantly reduce maintenance. Similar improvements at Boeing facilities in El Segundo, Calif., are expected to save an estimated 95,000 gallons (356,600 liters) of water a month.

What is a cooling tower and why is this important? A cooling tower works in combination with a chiller to remove heat from the air inside a building and release it to the outside atmosphere. An efficiently operating chilled water system provides air conditioning for offices, labs, fabrication and assembly areas.

Optimizing cooling-tower operations is critical to maximizing a facility's performance and reducing its environmental footprint. No one knows that better than the Site Services teams and councils who sponsored an improvement pilot that resulted in a major step toward saving water, reducing chemical usage, and lowering sewage and maintenance costs.

FROM RESEARCH TO REALITY

Roger Sampair, SSG lead mechanical plant engineer at Kent said the idea started when looking for improved technology in cooling-tower operations that would be better for the environment and save on maintenance costs. Sampair learned about a process to pre-treat the water used in cooling towers that doesn't involve chemicals and softens the water to prevent scale buildup.

"The result is a more efficient tower," Sampair said. "The steel industry uses a similar process to eliminate the buildup of chemicals and scale during steel production. The same philosophy can be applied at Boeing."

The testing at the Kent site showed significant results: Fresh water entering the operation has decreased by 40 percent; maintenance costs on cleaning the towers have been reduced from once a month to a couple times a year—approximately an 80 percent reduction—and harmful chemicals have been eliminated in the process. And these savings may just be a drop in the bucket—the potential savings could be \$5 million or more per year across the enterprise.

HOW IT WORKS

Cooling towers hold an average of 800 gallons (3,028 liters) of water. A building's or site's chiller operation uses the tower water to make chilled water for building, equipment and computer-room air conditioning to optimize operating temperatures.



PHOTO: Boeing heating, ventilation and air-conditioning mechanic Brett Weberg adds salt to the regeneration tank for cooling-tower water softeners at the Kent, Wash., site. The water softener is part of a new process initiated by lead mechanical engineer Roger Sampair (right) that will save water and reduce sewage and maintenance costs across Boeing. **MARIAN LOCKHART/BOEING**

However, as water naturally evaporates in the tower, minerals are left behind that can form hard deposits. These remains can stick to the surfaces in the cooling towers, affecting their efficiency. To reverse this, chemicals are added to keep the minerals suspended in the water, and then the water is drained out of the tower and replaced. This is known as a “blow-down” process. The cycle is periodically repeated to keep the tower maintained.

Sampair led the Kent Maintenance team in a one-year trial using the water softener with a 500-ton (454-metric-ton) tower that supports operations at the 7-107 building. Following promising results, a second system was installed in the Kent 18-54 building, where the benefits have been even greater due to high usage of the nine cooling towers.

Several groups, including the Site Services Plant Engineering and Enterprise Mechanical Technical Committee councils, identified this improvement as an enterprise operating cost reduction and championed its replication to other Boeing sites.

Cooling-tower water-saving improvements recently earned Kent’s Maintenance team a Boeing Conservation Award as one of 18 projects that reduced the company’s energy and water usage or increased alternative commuting and recycling rates.

The awards were recently expanded to include water initiatives, noted Jeff Nunn, SSG Conservation Initiative program manager.

CHANNELING SUCCESS

The Site Services team at the Boeing satellite manufacturing facility in El Segundo, Calif., was first to replicate the improvement with a similar pilot program.



PHOTO: Site Services engineer Art Kienle (left) and mechanic Doug Macpherson helped replicate water and cost savings from Kent, Wash., to El Segundo, Calif. GLADYS WICKERING/BOEING

Cooling towers are an important part of the site’s environmental control infrastructure because certain temperatures and the proper humidity are required when assembling and integrating satellites—and this Site Services business partner depends upon that reliability.

“The new process has made a noticeable difference,” said Art Kienle, a plant mechanical engineer in El Segundo who helped facilitate the pilot program. “The piloted tower was much easier and faster to clean than the others, which means the new system is working well and minerals aren’t depositing to the sides of the tower.”

According to Kienle, 90,000 to 100,000 gallons (340,600 to 378,500 liters) of water per month are saved using the new process.

The benefits add up—from reducing chemicals to consuming less water to lowering sewage and water costs, Kienle said. “Even our equipment will last longer because it will run more efficiently.”

Although the costs of water vary from site to site, Site Services Maintenance is looking for other opportunities across Boeing.

“That’s the real value—this new process can be replicated at other Boeing sites, so we not only conserve water, help protect the environment and save on maintenance costs here,” Sampair said, “but at other locations as well.” ■

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