



Cooling Tower Therapy

Technology optimizes hospital's HVAC performance

By Ed Sullivan

Hospitals contain some of the most diverse and demanding environments and thus require dependable HVAC system performance. Operating rooms, critical care facilities, data centers, imaging centers—not to mention worker productivity—all are affected by the operation of the HVAC system, particularly in warm weather.

When cooling towers are sluggish or out of service for maintenance, added stress is placed on chillers, and in turn, the performance of the HVAC system often is downgraded.

Such was the case in Elkins, W.V., at Davis Memorial Hospital, a subsidiary of Davis Health System. The 160,000-sq-ft hospital was founded in 1904, fully renovated in 1994 and now is undergoing a 72,000-sq-ft expansion. The modern hospital includes a 90-bed medical facility with nine intensive care and 36 telemetry beds.

The Selection Process

To overcome recurring cooling tower-related HVAC performance problems, Davis Memorial recently purchased two new cooling towers to support its two 300-ton Carrier chillers.

Like the owners of many industrial, business and institutional buildings, the hospital management was looking for a more advanced cooling tower technology that would optimize performance while minimizing maintenance requirements.

"I researched various cooling tower technologies on the Internet and found a unique line of cooling towers that features

a seamless plastic shell," said Steven Johnson, director of Davis Memorial Support Services. "The one that attracted my attention was a line that was made of high-density polyethylene [HDPE], manufactured by Delta Cooling Towers. Of course, there were a lot of other models available, but most of them seemed to be the metal-clad design."

For many cooling tower users, metal-clad models have become outmoded because they are vulnerable to corrosion from salt air, industrial gases and the chemicals that are used to treat the recirculating water.

Conversely, HDPE cooling tower shells are virtually impermeable to corrosive elements, including water treatment chemicals such as chlorine, in addition to UV rays.

In order to determine the best suited technology for their application, Johnson and engineers from Davis Memorial and Carrier decided to visit Delta Cooling Tower Mfg. for a plant tour to get a closer look at the design and building of the manufacturer's product line, which includes models ranging from 10 to 2,000 cooling tons.

"We were all impressed with the plant tour," Johnson said. "Not only was management helpful in explaining the features and benefits of various product models, but they also helped us confirm our preliminary specs for the cooling towers we had in mind. We were quite surprised to learn that this line of cooling towers was about 20% less expensive than many conventional designs."

Johnson also was pleased with the standard warranty offered

Opposite page: Fan motors on the old cooling towers were 30 hp each and consumed more energy than the hospital's new ones, which total 7 hp each and are at least 50% more energy efficient.

This page: HDPE cooling tower shells, depicted here, are virtually impermeable to corrosive elements, including water treatment chemicals such as chlorine.



on all of the products. While many metal-clad cooling towers are warranted for only one year, the HDPE-based cooling tower shells from Delta carry a standard 15-year warranty.

The two towers selected by the Davis Memorial team included a 250-ton TM Series unit and a 180-ton Paragon Series tower.

'Plus' Features

While the avoidance of downtime and the need for unscheduled cooling tower maintenance were critical requirements for Davis Memorial Hospital, there were other features of the towers' design that also presented significant value.

"The variable-speed, direct-drive motors that run the fans on our new towers also provide unexpected benefits," Johnson said. "First of all, these drives are far more efficient than we initially realized. The fan motors on our old towers were 30 hp each, and consumed considerably more energy than the new ones, which are only 7 hp each, and at least 50% more energy efficient."

Johnson explained that the hospital's old fan motors could merely be set to on or off. With the new variable-speed drives, they are set up so that it has to be a hot day before they run at 100%.

"The new direct-drive fans are usually running at about 40%," he said. "Running at 100%, they are only pulling 4 A, which is much less energy than before."

Johnson added that the new direct drives also are far less maintenance-intensive, which results in even greater savings. Additionally, with no belts, shafts, bearings or other external

parts to service, the direct-drive motors are virtually maintenance free.

Another important benefit of the new cooling towers is that they are quiet.

"Drives using belts often require adjustments, or you will hear them squeal," Johnson said. "We're a hospital, so quiet is expected. Also, we're located right in the middle of a residential community. In the past, we received complaints from people in the neighborhood if the belts were squealing, particularly if it happened at night when they were trying to sleep. That was a serious problem, so our maintenance people often had to fix the belts in the middle of the night. With the direct-drive fan motors, we don't have that problem."

Johnson said his new cooling towers not have only solved his chiller and HVAC problems, but have exceeded his expectations.

"These new cooling towers have virtually eliminated unscheduled emergency maintenance," he said. "That not only makes us happy, [but] our chiller maintenance contractor is also very pleased."

John Flaherty, president of Delta Cooling Towers, estimated that, with the combined savings on water use, energy, maintenance and chemicals, the hospital should see payback for the new cooling towers within two years. [IWWD](#)

Ed Sullivan is a technical writer based in Torrance, Calif. Sullivan can be reached at 310.787.1940.