



CASE STUDY

***CHEMICAL
PROCESSOR***

*SEES SIGNIFICANT
SAVINGS WITH*

***HDPE COOLING
TOWERS***

Replacing a cooling tower in disrepair with modern engineered plastic units allows global chemical manufacturer to reduce maintenance and energy costs, improve efficiency.

By GREG RANKIN

When it comes to heavy industrial cooling applications such as oil refineries, chemical plants, and paper mills, cooling towers have been employed for decades. Yet, according to industry research, the use of the technology in these sectors is on the rise. There are several notable reasons, including a longer average lifespan, consistent reliable cooling, and significant energy savings over alternative cooling options.

Traditionally, however, these heavy industrial manufacturers required cooling towers that were the size of buildings and constructed on-site. This is no longer the case, as advanced cooling tower technologies are not only offering a smaller footprint, but also delivering greater efficiencies with significantly less maintenance.

So was the case for a chemical processor in North Carolina where after years of incurring considerable expenses refurbishing and maintaining its aging cooling towers, the plant finally reached a critical point. The facility was looking to replace its existing wooden crossflow units with a more modern cooling tower solution. By switching to towers constructed of high-density polyethylene (HDPE) engineered plastic, the facility has been able to not only dramatically reduce its maintenance costs, but also boost efficiency.

“The company was spending tens of thousands of dollars each year on maintenance trying to keep the old towers operational, and it just became cost prohibitive,” said Varun Ganesh, sales engineer with Tencarva Machinery, a Greensboro, North Carolina-based integrator of industrial process equipment.

ENDURING THE ELEMENTS

In addition to the costs associated with maintenance, the efficiency of the old towers was also beginning to decline. Recognizing the need to reduce maintenance expenses and enhance efficiency, the company decided something had to be done. Given the nature of its chemical process, it needed a cooling tower solution that could withstand the demands of its environment.

“In this operation, there was a high likelihood that chemicals from the processing plant would enter the cooling system and deteriorate a metal tower,” Ganesh said. “So, they looked at two replacement options, which included cooling towers made of stainless steel and engineered plastic.”

In this application, the industrial cooling towers are used to reduce the heat from the equipment required to produce the chemical reaction. In the closed-loop system, water circulates from the source, also

called “the pond,” around several reactor tank vessels that require external jacketed cooling. The water then runs through the cooling towers where the temperature must be reduced by as much as 10-15 degrees Fahrenheit. Then the cooled water is recycled back into the pond.

While stainless steel was considered early in the process, the company ultimately decided on engineered plastic. HDPE cooling towers are impervious to the natural and chemical causes of rust and corrosion. They also require lower amounts of expensive water treatment chemicals and less downtime for repair or maintenance requirements.

“When spending such a large capital investment on a major utility,



Advanced cooling tower technologies are not only offering a smaller footprint, but also delivering greater efficiencies with significantly less maintenance. (Courtesy: Delta Cooling)

they were not going to compromise on quality,” Ganesh said. “They were also hoping to find the lowest total cost of ownership, and the engineered plastic tower’s corrosion-proof shell gave the facility the opportunity to greatly minimize repair and maintenance costs over time.”

BONDING WITH PLASTICS

Ultimately, the chemical processor selected four TM series towers from Delta Cooling. Together the engineered plastic towers offer a cooling capacity of 1,580 tons and can cool about 6,000 gallons of



The engineered plastic towers are proving to be significantly more energy efficient than the previously installed crossflow towers. (Courtesy: Delta Cooling)

water per minute. Delta Cooling developed the first HDPE cooling towers in the 1970s with many of the original towers still in operation today.

While HDPE cooling towers typically cost less than comparable stainless-steel models, there was another big reason that the chemical manufacturer felt confident in transitioning to engineered plastic.

“I think the 20-year warranty offered by Delta Cooling goes a long way to relieve any concerns,” Ganesh said. “That’s significantly longer than any stainless-steel or even galvanized-metal models that I am aware of.”

In addition to virtually eliminating maintenance — aside from standard preventive activities — the engineered plastic towers are proving to be significantly more energy efficient than the previously installed crossflow towers, further decreasing the overall cost of ownership.

“The older crossflow towers used large, 30-horsepower fans on each unit, which demanded a lot of electric power,” Ganesh said. “The new Delta HDPE units are equipped with smaller, 60-inch fans that operate at a lower horsepower, so the energy consumption is far less.”

Delta Cooling also offers fans directly driven by a variable frequency drive (VFD). This lets them vary the fan speed and avoid running them at max RPM except when necessary. The ability to tailor fan usage to cooling demand encourages greater energy efficiency — and substantial savings.

HIGH YIELD, LOW CORROSION

The towers also have proven to be more efficient. The original instal-

lation at the plant consisted of four cooling towers constructed of a corrugated metal outer shell with internal parts fabricated out of wood. During the warm summer months, the facility required all four to properly cool the water. However, with the new, engineered plastic towers, only three of the four are needed during peak times, a significant gain in efficiency.

“The final cell of the new towers is now available for increasing capacity at the facility if the chemical processor needs to scale up production in the future,” Ganesh said. “Plus, not having to use the additional motors on the fourth tower further increases their energy savings.”

Furthermore, the ease of installation is facilitated by the fact the cooling towers are pre-assembled in the factory and arrive at the site in just two pieces. The modular design of the towers required a smaller footprint allowing for two towers to fit in the same footprint as one of the old wooden cooling towers.

According to the plant maintenance supervisor, the towers are already offering a return on investment for the project.

“Plant management says they are getting better cooling now than they ever experienced at this location before,” Ganesh said. ♪

ABOUT THE AUTHOR

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