

Hospital Cooling Tower Case Study

Airborne Debris Puts Baptist Hospital East Cooling Towers In Intensive Care!

By Randy Simmons

Whether cooling towers are used for process or environmental cooling, proper tower maintenance is critical for ensuring optimal performance in meeting the cooling demands of the facility or operation. Airborne debris that gets drawn into cooling towers is the single biggest problem contributing to system fouling, reduced performance, downtime and maintenance cost.

When cooling towers aren't properly maintained, performance will suffer, resulting in increased indoor temperatures, a reduction in occupant comfort levels including reduced employee productivity; and it can affect computer rooms and the equipment and operations they support. Furthermore, when cooling towers fail in process cooling applications, it can bring production to a grinding halt, and the cost of lost productivity can be staggering. The following war story demonstrates the kinds of problems that can occur with any cooling tower (process & environmental cooling applications) and how one hospital solved their cooling tower problems.

The Subject Facilities

Several modern medical buildings housing the corporate offices of Baptist Healthcare System as well as physician offices and other health service facilities next to Baptist Hospital East (BHE), of Louisville, KY, the regions leading hospital for Oncology, Cardiology, Orthopedics and Neurosurgery.

The Problem

Over the past 16 years, managing the cooling of the buildings had been a challenge due to the maintenance challenges of two BAC (Baltimore Air Coil) cooling towers. Gilbert Fister, Properties Manager for BHE's campus buildings, was faced with taking the towers out of operation for scheduled maintenance twice a year, plus, due to the high seasonal concentration of airborne contaminants that got drawn into the towers, they required unscheduled maintenance associated with system fouling and clogging. "In the spring and summer, Mayflies, pine needles and other matter would seriously clog our fill material and basin strainers and trigger a series of other operational problems," said Fister.

Although the BAC cooling towers are equipped with water filtration systems, they required weekly monitoring and cleaning and did little to protect debris from getting into the cooling water in the first place. Further, they did nothing to protect the fill material from getting clogged with the debris being drawn in, resulting in a reduction of thermal efficiency as the cooling water passed through the fill material. Additionally, organic debris (insects, pine needles, cottonwood seed, leaves dirt and other



Air Intake Filter On BAC Cooling Tower

Airborne matter) would collect in the basin and decompose, resulting in sludge build-up that supported bacteria proliferation, plugged the basin strainers and reduced cooling efficiency when circulated through the chiller. On many occasions, debris got through the basin strainer, resulting in the solenoid blow-down valve getting stuck in the open position; this triggered automatic release of water treatment chemicals and prematurely drained the treatment chemical tank requiring BHE to call for emergency refills. Furthermore, when the blow-down valve stuck in the open position, it resulted in the loss of thousands of gallons of make-up water because the sump would not retain the water. In short, the system would fail.

During scheduled maintenance, the towers were routinely cleaned using a pressure washer and cleaning solvents - much of the work was focused on cleaning the fill material which had high debris concentrations of its surface. Over the course of a year, literally thousands of dollars were spent on just keeping the cooling towers operationally and ecologically sound. Gilbert was not satisfied with the situation and set out to improve the maintenance demands being placed on these important systems.

The Solution

While consulting with their maintenance contractor Gilbert realized that they needed a solution that would prevent debris from getting into the cooling towers in the first place rather than trying to manage the debris once it got drawn in. Gilbert researched this option and contacted Air Solution Company of Commerce Township, Michigan, the leading producer of cooling tower and chiller coil air intake filter systems. Unlike traditional air filters (commonly used in air handling unit filtration banks) air intake filters mount to the outside of the intake opening and are specifically designed to isolate the

airborne debris on the outside of the cooling tower. The filters are constructed of a UV resistant, non-electrostatic vinyl coated polyester media that resists mold and mildew, never needs changing and are easily cleaned using a brush, broom or shop vac. Since their installation in 1999, BHE has eliminated sludge build-up and has not experienced strainer or blow-down valve clogging. Furthermore, they have reduced their chemical consumption by over 50% and reduced their make-up water consumption by 35%. Because *Air Intake Filters* now keep debris out of the system, BHE hasn't required unscheduled service due to system fouling - saving thousands of dollars in labor and service cost. In short, Gilbert "hit a home run" in reducing the maintenance and operational cost associated with their cooling towers.

"Since the installation of the *Air Intake Filters*, we now only inspect our towers monthly and find little or no maintenance required versus our inspecting them weekly before the filters were installed and nearly every time finding a need for some maintenance work. Installing *Air Intake Filters* on our cooling towers has saved us countless dollars and has given me "peace of mind" knowing that we're now optimizing our operational efficiency and protecting the core of our cooling systems." Said Gilbert Fister.

Water Treatment and Mechanical Service Providers Perspective?

Most companies and institutions that outsource their HVAC system services do so as a means of reducing their cost of operations while improving system efficiencies. This typically entails establishing annual service contracts with water treatment and mechanical contractors to ensure scheduled maintenance intervals. But to truly optimize the cost savings, the system itself must be efficiently equipped so that the savings realized through not maintaining an in-house HVAC service team isn't lost to extraordinary and unscheduled service needs.

In BHE's case, their water treatment service provider contracted for annual service and chemical replenishment based upon normal maintenance and operation. But when chemical consumption dramatically increased because the blow-down valves would get stuck open, it was the chemical service provider that wound-up eating the added cost during the contract period. Hence, when the *Air Intake Filters* were installed, both BHE and their water treatment supplier were winners.

According to the service company used by BHE, "use of the *Air Intake Filters* have helped us to keep their cooling towers running optimally and has reduced our maintenance cycle time by nearly half. The advantage to BHE is that their towers are out of service for shorter periods of time during scheduled maintenance. Furthermore, it helps us free-up valuable service time, giving us greater flexibility to deploy our service team where they are needed most and to serve more customers per day. Because the *Air Intake Filters* do such a good job of helping keep BHE's towers clean, they help us to optimize the profitability of our maintenance contract because we now only deploy resources at scheduled intervals and we have virtually eliminated unscheduled emergency maintenance at BHE.

Benefits of Air Intake Filtration at BHE (recap)

- Stopped insects, pine needles, leaves, paper and other airborne debris from getting into cooling towers.
- Stopped clogging of fill material – enabling optimal thermal release.
- Helps prevent sludge build-up in basins.
- Stopped basin strainer clogging.
- Stopped clogging of blow-down valve.
- Reduced consumption of water treatment chemicals by 50%.
- Reduced consumption of make-up water by 35%.
- Improved chiller efficiency.
- Eliminated unscheduled downtime and maintenance service calls due to clogging and fouling.
- Reduced maintenance cycle time by nearly 50%.

When it comes to maintaining cooling towers, it ultimately requires a team effort between the customer and the mechanical and water treatment service providers. Using *Air Intake Filters* in conjunction with a well managed water treatment program and scheduled maintenance program will ensure that cooling towers perform optimally, while helping avoid unscheduled emergency service. ■

Randy Simmons is VP for the Air Solution Company, a manufacturer of air intake filtration systems for cooling towers, chillers and other high volume/high velocity air intake systems. For more information on air intake filtration, contact your local air intake filter distributor or call Air Solution Company, Commerce Twp., MI. for a distributor nearest you. Tel 513-860-9784 Fax 513-860-9785
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