**Keeping Your Cool: Tips for Maintaining Your Cooling Towers**

**Here's how to protect process cooling systems from costly summertime fatigue.**

By Ed Sullivan[**-**](http://www.pharmamanufacturing.com/articles/2010/118.html) [**+**](http://www.pharmamanufacturing.com/articles/2010/118.html)

The hot summer and fall months place inordinate demands on cooling systems, so if your cooling tower and related equipment are not in good physical shape, there could be a terrible price to pay in loss of process efficiency, damage to downstream equipment, and loss of production.

Like overheating the engine in your car, the loss of cooling capability from industrial cooling towers during hot summer months can result in a number of serious consequential “systemic” problems, including paralyzing and pricey damage such as excessive downtime, destruction of equipment, and loss of product due to quality issues.

“Like your car, when you run a cooling tower in the ‘red,’ you are going to see consequential damage,” advises Tom Ryder, a longtime cooling tower customer support specialist. “When you continuously run a car in the red during the heat of summer, you are exposing yourself to a series of heat-related problems, including damaged gaskets and seals, premature cylinder wear, warped cylinder heads and even catastrophic engine damage. When a cooling tower is suffering from a lack of preventive maintenance, you could experience over-heated equipment, increase in scrap material, refrigeration losses, heat exchanger inefficiencies, and other severe operational consequences.”

Ryder, an experienced sales engineer with Delta Cooling Towers (Rockaway, N.J.), a manufacturer that specializes in low maintenance plastic cooling towers, uses the car analogy because he says most people can relate to it, whereas many don’t quite appreciate the relationship of cooling towers influence on overall process cooling, including the production losses and potential for equipment damage.

Cooling towers play a critical role in cooling process equipment used in pulp & paper production, petrochemical processing, manufacture of plastics, metals and textiles, the processing and storage of food, beverage and pharmaceutical products, and many HVAC systems.

He explains that if cooling towers are not kept in good shape, and receiving preventive maintenance, the ambient heat of the summer months will detract from their cooling capacities, making them “fatigued”, which can in turn put a strain on system equipment and processes downstream.

Even if the downstream equipment is not impacted directly by hot weather, the cooling tower is, explains Ryder. “Therefore, unless the cooling tower is well maintained, the water it provides devices such as heat exchangers, production machinery and HVAC systems will be less able to draw off heat. For example, the ‘cold side’ of a heat exchanger will receive water that is not as cool as optimum. Therefore, the heat exchanger will be less able to draw off heat from process fluids.”

If the cooling tower shell is in bad shape, or requires too much repetitive maintenance, then perhaps the system should be replaced with one of today’s more advanced models, such as seamless plastic cooling towers.

**A High Price to Pay**

The cost of overlooking the maintenance of a cooling tower can be heavy, almost regardless of application, Ryder warns. In the pulp & paper industry, for example, a process interruption for unscheduled service can run into hundreds of thousands of dollars.

“The same thing can occur in chemical processing. If you don’t sufficiently cool that equipment, forget the normal fears about downtime,” says Ryder. “You’re going to be repairing and replacing hardware, so, you will have an impact that is both loss of production and loss of capital equipment.”

The impact can be amplified in applications where there are cooling towers operating with sometimes dozens of devices daisy-chained off them.

“That is often the situation in the injection molding industry,” he says. “So, you have to be concerned about downtime plus the loss of machinery that is vital to your application. If the cooling tower is not cooling enough, and causes a series of injection molding machines to overheat, the very expensive molding equipment is going to produce scrap parts or just going to lock up like a seized engine. It could take weeks to replace the equipment, if necessary, and certainly days to clean it up - if no catastrophic damage has occurred.”

In the food industry, where a cooling tower supports critical food processing machinery, the HVAC system as well as refrigerators and freezers, the loss of even part of the cooling power can cause extensive losses of frozen products, produce, or other perishable products.

**Both Routine and Preventive**

Just as with automobiles, the need for routine and preventive maintenance of cooling towers is more pronounced in the summertime. Fill material or wet decking should be serviced or replaced in cooling towers. Fouled fill material will not get sufficient air volume contacting the system’s water to dissipate heat efficiently. Therefore, it will make the fan(s) and motors work harder, adding significantly to energy costs, or worse make them unable to achieve required cooling temperatures.

“If you are running water through fouled cooling tower wet decking, you will not get the necessary dissipation of heat, and the water getting down to the tower sump will not be cold enough for the processing equipment,” Ryder adds. “Ventilation louvers should be washed down, as well as the wet decking, which facilitates the cooling evaporation process. Drift eliminators should be checked to prevent unnecessary water loss. Plus, any repairs such as patching, welding or cleaning of cooling tower sheeting should be done as required.”

Cooling towers cool water through heat transfer and evaporation. With a loss of 1% water for every 10 degrees of cooling required, the evaporation factor can be very significant – 20 or 30 gallons per minute is not uncommon for small towers. When evaporation occurs scale is left behind, which can interfere with cooling tower efficiency and require expensive maintenance or acid cleaning. Because plastic cooling towers are impervious to residual salts, the tower cannot be damaged and fill material can be cleaned up by most aggressive de-scalers. Metal towers, on the other hand, can be irreparably harmed by de-scalers, causing a premature whole tower rebuild or replacement.

**Replace vs. Repair**

Ryder says that sometimes preventive maintenance is not enough, or perhaps has been overlooked for too long, making the replacement of a cooling tower the most practical solution.

“To use the automobile example, when you are spending more than a couple of thousand dollars a year in maintaining your car, you may weigh that expense against spending a couple of thousand dollars a year in payments for a brand-new car,” he says. “The same consideration may apply to cooling towers, particularly the old, metal-clad designs that require and are very sensitive to frequent chemical treatments, patching and welding.”

He adds that Delta Cooling Towers, which are based on a seamless engineered-polyethylene shell, offer a much lower cost of ownership because overall maintenance is minimal and the tower shell doesn’t require preventive maintenance, nor does it ever have to be relined or repaired.

“But even a cooling tower as durable as these seamless engineered plastic models still should receive some inspection and maintenance in preparation for hot weather,” Ryder says. “You still should clean your PVC fill or packing material, you should still make sure that your louvers are clean for optimum air flow and minimized need of the electric fan, and you should still ensure that drift eliminators are operational. That will go a long way toward avoiding cooling tower ‘fatigue’ for many years to come.”

**About the Author**

Ed Sullivan is a technology writer based in Hermosa Beach, California.