Hellan Fluid Systems

Case Study

Location: Milwaukee, WI
Customer: Hotel/Office Complex
Application: HVAC Chiller Loop



Image 1

Water Intake

Challenge

A hotel/office complex located in central Milwaukee, Wisconsin experienced significant down time and expense in relation to mechanical wear of an existing duplex basket strainer. The strainer was installed in a pump suction line withdrawing water from the Milwaukee River. The cast strainer body included an integral slide gate valve to isolate one basket and allow cleaning of the second basket. Mechanical wear over the years resulted in leakage around the isolation valve. In addition, this failure also caused periodic introduction of air into the system requiring manual re-priming of the pumps. The repair of the damaged valve seat was not feasible which resulted in a significant amount of labor to keep the system operational.

Solution

The client selected Hellan's self-cleaning strainer design for this pump suction application. Surface waters present a challenge for any strainer due to seasonal variations (leaves, algae, etc.) and other environmental variables that cannot be controlled, such as debris from the surrounding atmosphere that can foul heat exchangers (i.e., bottle caps, cigarette butts, bags, etc.)

A Hellan self-cleaning strainer with 20" inlet/outlet connections was selected to replace the duplex basket strainer. Solids are removed from the river water on the exterior surface of two cylindrical screens. The differential pressure across the screens increases as the solids collect on the screen surface. At a pre-determined DP value of 4 psid, a cleaning cycle is initiated automatically. Solids are removed from the screen surface by mechanical scraping bars adjusted to within 0.005" of the screen surface. As a point of reference, 0.005" is sufficiently close that it will remove a leaf from the screen surface during the fall foliage season.

The scraping mechanism is a metal bar with a knife edge designed to shear solids from the screen surface. This is a unique design feature that eliminates hard to remove solids such as Zebra and Quagga mussels which attach to surfaces and cannot be removed by simply reversing the fluid velocity across the screen surface which is what other designs rely on. Image 2 shown below illustrates the damage mussels can cause in piping systems if not addressed.



Image 2

Unlike a basket strainer, the Hellan automatic self-cleaning strainer does not require operator labor to open the strainer to remove and clean baskets. As such, operator exposure to contaminants and introduction of air into the piping system have been eliminated.
A review of the facility SCADA logs revealed that during an early spring rain when the Milwaukee River was dirty from a heavy snow melt, the strainer cleaned automatically 21 times in a 24-hour period without any operator involvement. In late summer when the river was low and relatively clean, the strainer cleaned only once per 24 hours based on a default timer in the control system.

Self-cleaning strainers can provide a simple, reliable solution for solids plugging heat exchangers and other equipment such as surface condensers where cooling water is utilized.

Benefits

- Improved efficiency
- Reliable performance
- Reduced down time
- Significantly reduced labor & maintenance costs