IKEA Innaloo

Water saving case study

IKEA Innaloo has saved 24% of their total water consumption by identifying and repairing a faulty ball float valve in one of their cooling towers.

Cooling towers are important components of cooling systems in large facilities and often consume large amounts of water; in some cases up to half of a sites total water usage.

Cooling towers are used to reject heat from air conditioning systems. A flow of air in the tower is used to cool warm water and as a result of this process some water evaporates leaving the remaining water cooled to be recirculated through the cooling system.

To operate effectively cooling towers require a flow of fresh water to make up water lost from the system via evaporation. It is also important to balance the amount of water lost via bleed, which is the process of removing suspended and dissolved solids left behind during the evaporation process. Without bleed the solids may build up in the system leading to scale formation or fouling.

The amount of fresh water supplied via the make-up line is regulated by a ball float valve. When the water in the tower drops below a predetermined level fresh water is supplied to make it up to the predetermined level. Ball float valves however, are located inside the tower itself which can often make problems difficult to detect.

In August 2011 IKEA's water treatment providers identified a faulty ball float valve in one of the cooling towers. The fault was causing the valve to remain open resulting in water continuously flowing into the tower at an estimated rate of 20 litres per minute. This water simply overflowed from the tower directly into the sewer. Not only was this consuming excessive amounts of fresh water but the added water was causing the dilution of chemicals responsible for maintaining the system's corrosion control.

A loss of corrosion control can lead to increased scale formation and fouling and damage other areas of the system. In this case a loss of corrosion control caused the failure of two of the chilled water pumps which then had to be replaced at a cost of $2805 each. The full extent of the damage to chillers was not discovered until they were opened up and inspected. The damage was

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quite extensive with management estimating the cost of repairs running into the tens of thousands of dollars.

The estimated amount of water lost from the system due to the faulty float valve was 5,550kL at a cost of over $25,000 to IKEA in water and sewage charges. If the problem had remained undetected over the period of a year IKEA Innaloo would have been faced with costs of over $48,000 in water and sewage charges, not to mention the costs to repair the chillers. The cost to repair the faulty ball valve was only $120.

Once the ball float valve was repaired it was also observed that the predetermined level of the float was too high causing water to continuously overflow and be made up with freshwater. The float set level was adjusted and further water savings were achieved.

Since the incident IKEA Management have implemented a daily check sheet which includes checking the towers for leaks and overflows first thing each morning by the technical staff on duty. Weekly checks by the Facility Manager are also now undertaken to check for any abnormalities and to act on them immediately. This is coupled with regular reading of the centres water meters to trend water use and identify anomalies leading to increased use, such as a leak.

IKEA has also recently joined our Water Efficiency Management Plan Program and plans to implement a number of water efficiency initiatives, including the installation of water efficient appliances to further improve water use within the centre.

The faulty float valve was causing water to flow into the tower at 20L/minute wasting water and impacting on system corrosion control.

Water continued to flow into the overflow pipe once the valve was repaired as the level of the float valve was set too high.

Extensive damage was caused to the system chillers due to a loss of corrosion control caused by excessive water use over a long period of time.