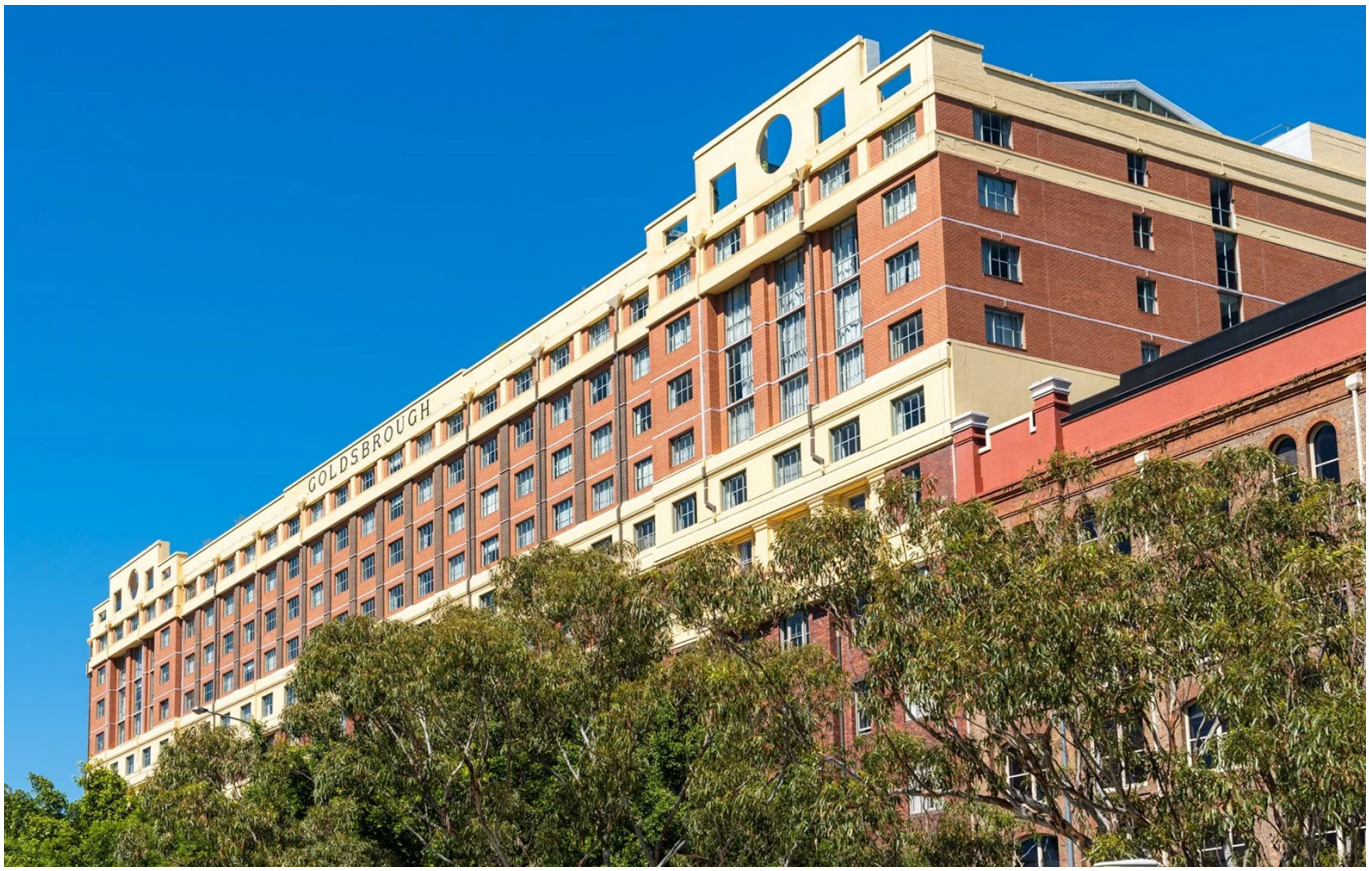
HydroChem

Case Study

Commercial Buildings

Fill pack replacement

Sydney Icon Gets a Cool(ing) Makeover



The Goldsbrough Building is one of Sydney's most historic buildings, a true Victorian original. When originally designed it incorporated state-of-the-art technology that was ahead of its time. The iconic building was again a sustainability leader when converted to apartments in the mid 1990's.

A recent overhaul of its cooling tower and HVAC system was in part delivered by water specialists HydroChem who help to manage the water in the building. The new dosing and monitoring system and tower fill pack has delivered impressive savings.

The History

The Goldsbrough Building in Sydney's Pyrmont district was a gamechanger for the wool industry in Australia in the late 19th century. The brainchild of merchant and innovator Richard Goldsbrough, the building was the first of what would eventually be over twenty wool stores taking advantage of the 1890's extension of the railway line all the way to Darling Harbour.

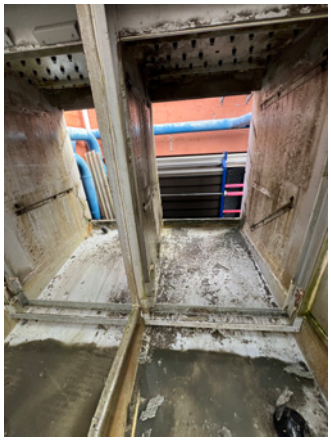
Despite the building's austere Victorian exterior, the interior was an advanced modern masterpiece. The building featured separate hydraulic goods and passenger lifts, and a sawtooth glazing roof made with ground glass that provided a glare-free area to view the wool.

The Goldsborough housed up to 50,000 bales of wool which had to be stored, taken through to the viewing room for classification and then returned to storage.

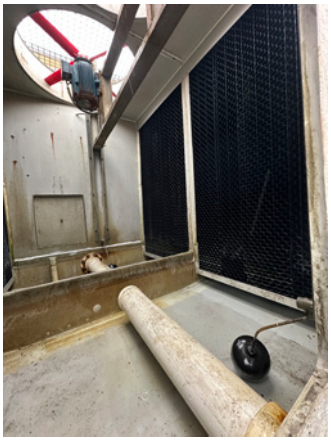
Three more floors were added in 1924 but sadly caught fire only a decade later and burned for almost two weeks. The Stuart Brothers, the original builder, subsequently restored the building maintaining the original exterior.

Planning commenced in 1990 to turn the building into 500 plus apartments, which were completed and occupied in 1994. The Goldsbrough building continued to lead from the front when it signed up as an original member of Sydney's Smart Green Apartments program in 2011.

More recent upgrades include replacing end-of-life electric boilers with new efficient heat pumps and capturing cooling tower condensate that is reused as makeup water. This has reduced water top-ups resulting from evaporation by almost 40 per cent.



Work in progress showing empty cooling tower



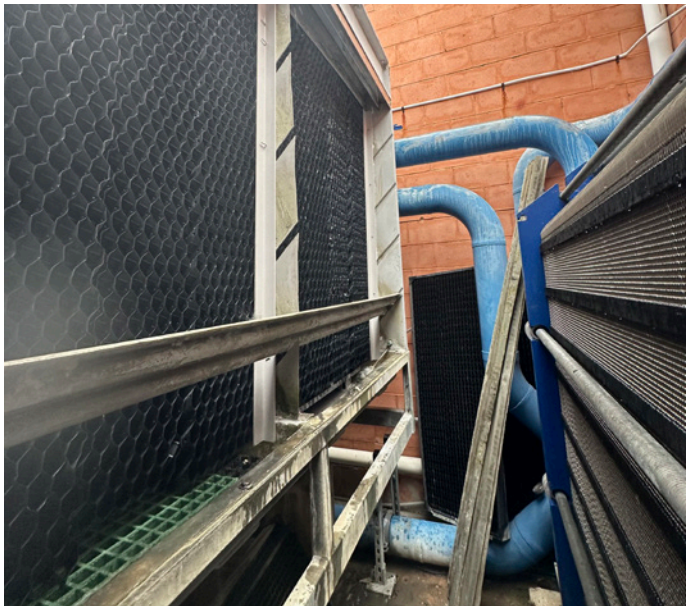
Work complete showing internal view

The Challenge

During the scoping of the project, the existing Temcel crossflow cooling tower was identified to be fitted with original sheet fill. This once commonplace technology is now outdated and no longer considered optimal for tower performance and maintenance.

One of the initial challenges facing the HydroChem team performing the work was access. Space was very tight around the cooling tower and careful planning was necessary to safely remove and replace the fill pack.

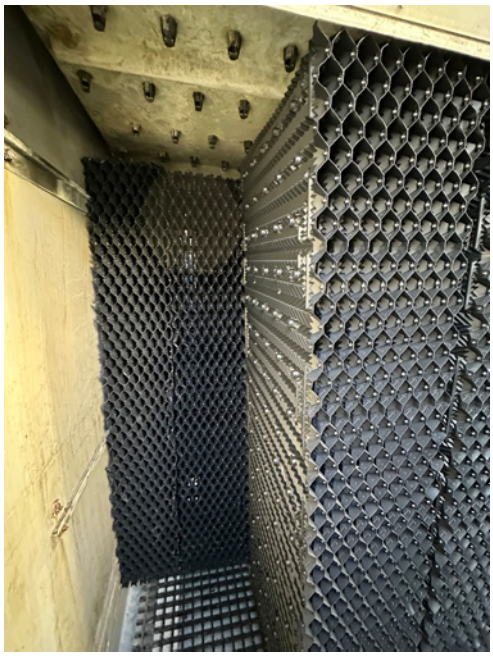
With the building in use around the clock, interrupting the cooling supply for any extended period of time was not an option. This meant that it was imperative that at least one cooling tower remained operational at all times. Coordinating the project with the Goldsbrough Building facility manager and keeping him fully informed of scheduled work was essential to minimising occupant disruption and maintaining uninterrupted cooling to the building.



Work complete showing limited access and XF75IL Crossflow blocks installed

The Solution

HydroChem replaced the original sheet fill with more modern, modular block fill pack. This resulted in improved efficiency, durability, and makes future maintenance easier to undertake. The modular design also aided installation within the restricted access area in the vicinity of the cooling tower.

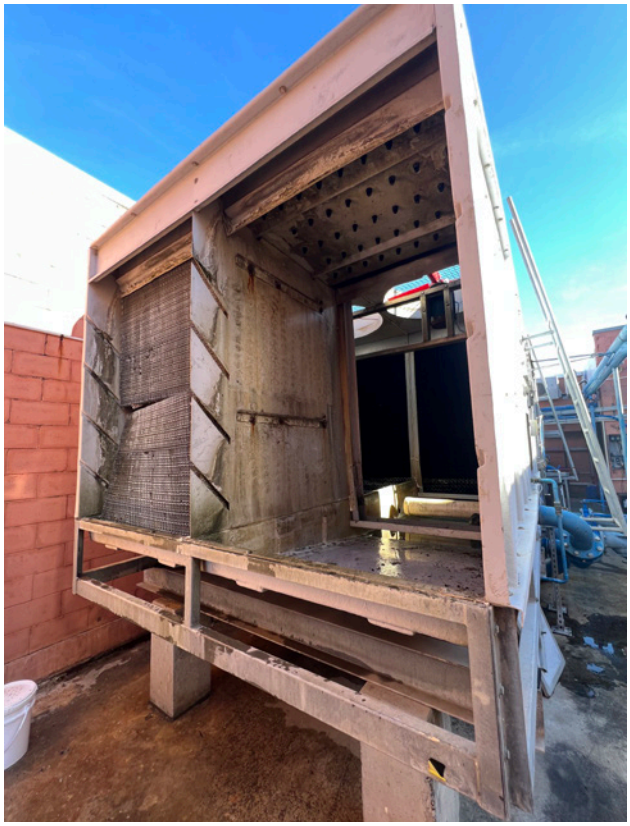


XF75 fill pack modular blocks during installation

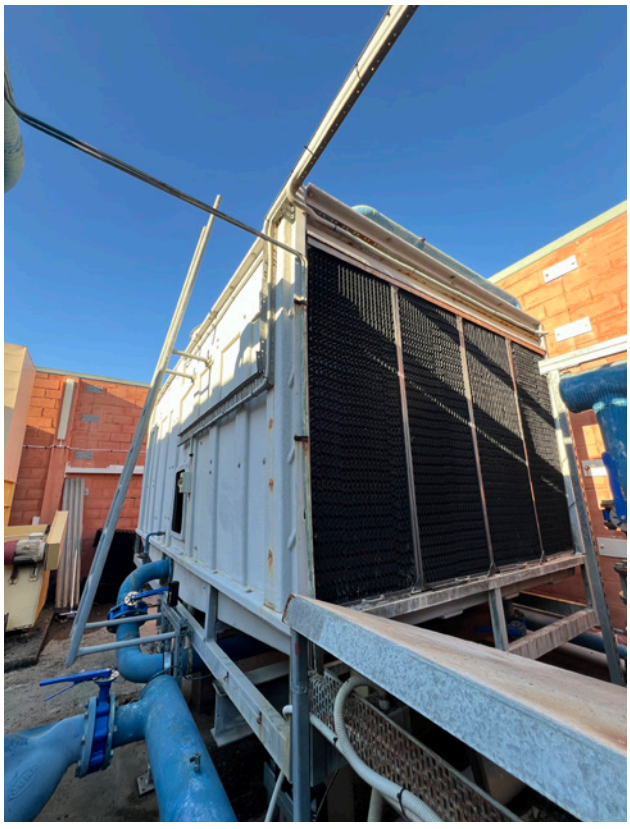
Sheet fill is known to stretch and flutter over time allowing air and water to bypass the media, reducing efficiency and potentially increasing the possibility of drift. Block fill eliminates these points of failure as the smaller modular blocks are rigidly adhered into solid, larger blocks and designed to have a supporting base. Block fill pack is much thicker than fill sheets – up to 85% – and provides enhanced longevity and UV resistance.

The works were staged to ensure one cooling tower remained fully operational throughout the project. This maintained adequate building cooling and occupant comfort at all times.

Clear communication and coordination with all stakeholders ensured the project was completed safely, efficiently, and with minimal disruption.



Work in progress shows old crossflow sheet fill being stripped from the cooling tower



Cooling tower with old crossflow sheet fill prior to work commencing

The Result

In December, HydroChem received an email from Oaks Sydney Goldsbrough Suites Facility Manager, Gary Binskin.

"Summer has started," explained the facility manager, *"and everyone has their AC cranking in their apartments. Both our mechanical contractor from Empire Air and I have been closely observing our HVAC performance over the past two months. Since HydroChem undertook the maintenance and upgrade work in autumn, we have both been impressed by the marked improvement in our system performance."*

"In fact, the new fill pack is working so well that on the 28°C day last week, we had the water circulating without the fans and the air temperature was around 21°C," Binskin added.

The current configuration for the Goldsbrough Building is that of a mixed use, residential building. It consists of 526 apartments and 48 commercial spaces, the vast majority of which are air-conditioned.

The return water temperature is 31°C. The combination of reconditioning the heat exchangers and the new fill pack has the water exiting at 25°C, the optimal supply temperature to the air conditioner package units. This outcome has been possible without the cooling tower fans being called into operation, previously both cooling tower fans would have been running to achieve this result.

"We estimated a 10-15 per cent performance increase overall," says Binskin. *"We believe this translates to a significant reduction of between 25-30% in electricity consumption."*