

Case Study



Natural History Museum

The Customer

The Natural History Museum in London exhibits a vast range of specimens from various segments of natural history. The museum is home to life and earth science specimens comprising some 80 million items within five main collections: botany, entomology, mineralogy, palaeontology and zoology. The museum is a centre of research specialising in taxonomy, identification and conservation.

Given the age of the institution, many of the collections have great historical as well as scientific value, such as specimens collected by Charles Darwin. It is one of London's leading attractions.

The Challenge

The Museum had recently replaced their water chillers serving the galleries but kept the original dry coolers. It became apparent that the cooling system was not working effectively, therefore affecting the galleries.

Birdsall were employed by the museums FM provider CBRE to work on site as the HVAC maintenance contractor. Therefore, CBRE tasked Birdsall with identifying & rectifying the faults in the cooling system.

We carried out an initial survey and identified a faulty fan speed controller affecting the performance of one of the dry coolers. We broadened the investigation to include a complete condition survey on all the water chiller cooling systems. The cooling systems included three brand new water-cooled screw chillers located in a basement plant room and four dry coolers sited on the roof, that are approximately twenty years old.

We identified that the energy efficiency was poor across the systems. This was due to all six fans operating at full speed despite low ambient conditions and low load. This resulted in hunting water temperatures and high energy consumption. We recognised that the dry coolers needed to be upgraded to improve operation, energy efficiency and control of water temperature. This upgrade was essential to allow the newly installed chillers to operate correctly & efficiently within design parameters.



Dry coolers serving the galleries

The Solution

The solution was to upgrade the dry coolers to work effectively with the new chillers with new Variable Frequency Drives (VFD).

Birdsall engineers measured, selected and installed new Variable Frequency Drives to operate the six fans installed on each of the dry coolers.

We installed additional sensors to provide analogue input 0-10Vdc to the VFD to closely monitor the supply water temperature. This allowed the fans to closely maintain the water temperature set point.

The VFD installed was designed to operate using existing fan motor protection devices and BMS enabling controls. This would enable CBRE to better monitor cooling and energy performance.



Installed Variable Frequency Drive

The Outcome

The dry coolers now operate and maintain the water temperature set point effectively and reliably with reduced energy consumption.

We commissioned the VFD with ambient at 23 degC and fans operating at a reduced rate of 32Hz. The power consumption has therefore reduced compared with the previous operation.

The museum now has a reliable and more energy efficient cooling system serving the galleries.



Upgraded dry coolers serving the galleries

Customer Quotation

"Birdsall provided the expertise to identify the faults and solutions to what was a critical problem for the museum. They delivered their services promptly and professionally to ensure the problems were short lived".

Facilities Manager