JOHN HANCOCK CENTER

CASE STUDY:
Delivering Stability Behind the Scenes

- *1,800 tons of recovered cooling capacity*
- *Reduced HVAC energy consumption by over 25%*
- *ΔT performance increased nearly 300%, from 6 to 18° F*

Nicknamed “Big John”, The John Hancock Center was the second tallest building in the world when it was completed in 1969. Its 100 floors soar 1,127 feet high, creating a total floor area of 2,799,973 sq ft. The John Hancock Center was originally conceived in 1964 with the intention of incorporating residential and commercial businesses in the heart of Chicago.

FAST FACTS

LOCATION
Chicago, IL

BUILDING TYPE
Mixed-use skyscraper

FLOOR AREA
2,799,973 sq ft
100 floors

YEAR COMPLETED
1969

PROJECT DATE
2007-2008

DELTA P VALVE

CASE STUDY

THE PROBLEM

Having won several awards over the years for achievement in architectural design, building owners knew the infrastructure of the building needed to be on par with the advancement of the exterior. Chicago is known for its sweltering summers, and in 2007, John Hancock Center's building engineer was facing performance issues in the center's HVAC system. The building had two 1800-ton chillers that were each 40 years old, and when temperatures in Chicago rose above 70°F, the owners were forced to turn on the second chiller. Despite being designed to achieve a 12°F chilled water delta T, the system was running at only 6°F delta T.

At that time, a principal engineer was brought in to conduct a feasibility study. During the analysis, they determined the performances issues in the HVAC system were due to flow, rather than capacity. The initial recommendation to replace the two 40-year old chillers, along with the chilled water coils and the control valves, would not address the flow control issues.

THE SOLUTION

Pressure independent control valves were introduced as a solution to correct the unstable operation and guarantee delta T performance. Since the John Hancock Center combines 100 stories of retail, office, restaurant, and residential space, the replacement valves had to be able to handle a wide range of flow rates, differential pressures and various system operating modes. Web research led the principal engineer to discover Flow Control Industries and the DeltaPValve®. The precision control DeltaPValve® delivers stability behind the scenes and comfort to the front lines by eliminating the leaving air temperature fluctuations, differing from other pressure independent control valves. Whereas the ASHRAE guideline for leaving air temperature stability is within ±1.5°F of setpoint, Flow Control's DeltaPValve® system targets within ±0.1°F of setpoint, or 15 times better control than a standard system.

After meeting with a local rep to observe a demonstration, a side-by-side evaluation with a competitor's valve sealed the deal – the building owner and principal engineer saw how robust the DeltaPValve® was, and knew they required the stability, turndown and quick response required to maintain precise control, that only the DeltaPValve® provided.

DELTA P VALVE

CASE STUDY

THE RESULTS

The engineering project started in April of 2008 and was completed by October 2008. After installing DeltaPValves, the John Hancock Center experienced an immediate improvement in flow control. They were able to shut off the second 1800-ton chiller under conditions where it was previously required, and went from achieving a 6°F delta T up to 12-18°F delta T, while design was only 12°F. The delta T was so high that people thought it was an error they were getting 18°F, but all systems were stable and comfort was maintained or improved throughout the building. Following that, building owners were able to defer chiller plant replacement for 5 years, when a new owner took over. At that time, the two chillers were then replaced with smaller, more efficient machines because the DeltaPValve System helped to effectively stabilize the system and reduce the cooling load.

"We went from achieving a 6°F delta T up to 12-18°F delta T on building where design was only 12°F. The increase in delta T was so substantial people thought it must be an error."

- ALISA GADILHE
Principal Engineer

About Flow Control Industries, Inc.

Flow Control Industries, Inc. (FCI) is a specialty manufacturer of high-performance pressure independent control valves, delivering energy efficient products and services through a consultative process to increase building value and lower total cost of ownership (TCO).

The DeltaPValve®, FCI's flagship product, was developed by founder and Chairman Paul Skoglund, P.E. over 20 years ago when he realized that more effective valves could revolutionize mechanical system efficiency. As an industry pioneer, Paul was the first to create the patented design, development and application of pressure independent control valves.

Since the release of the first DeltaPValve®, FCI's team of world class engineers has worked to improve its design, efficiency and overall effectiveness. This focus and dedication has propelled the DeltaPValve® to the top of the industry, being the only variable flow hydronic system that GUARANTEES ΔT.

DeltaPValves are used in projects all over the world and are consistently saving customers millions of dollars in first costs, operating costs and deferred capital costs.

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