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Bringing a New York City landmark legacy building up to today's standards



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When JFK&M was retained to upgrade the infrastructure of the Foundation Building at Cooper Union, we took a tour through the awe-inspiring landmarked 1859 building that included the famous "Great Hall" where Abraham Lincoln gave his historic campaign speech to abolish slavery. In 2008, Barak Obama went back to the same Great Hall and marked another historic moment with a very moving and emotional campaign speech by the soon to be, "First African American President." Hence, we understood the importance and sensitivity of undertaking this project in such a significant structure.

One of our architectural and mechanical/electrical challenges was to maintain the original integrity of the space while improving its overall comfort and performance for today and a long time into the future.

The mechanical infrastructure at the Foundation Building had exceeded its useful life. In addition, Cooper Union was committed to a "green" objective that promotes energy efficiency and environmental responsibility.

Therefore, JFK&M needed to bring the systems within the landmark building up to today's standards by improving their condition and their operating efficiency while implementing sustainable solutions. Part of these improvements was the seamless integration of a cogeneration plant to supplement the building's electricity and create additional capacity to provide chilled/hot water to cool or heat the building.

An additional challenge surfaced midway thru the design phase when Con Edison said that they would no longer service the building with steam. Since Con Edison Steam was used both for heating and cooling, we now needed to take a different design approach and produce a solution to both heat and cool the building.

And, since the building was Landmarked, we had limited roof space and limited ability to locate louvers on the building and have equipment outside the building that could be seen from street level.

A final challenge was that the building was fully operational throughout the project accommodating full schedule classes for the architecture, art and engineering schools and their supporting spaces.

Clearly, JFK&M needed to find creative, high tech and sustainable solutions that would meet and exceed the electrical and HVAC requirements of Cooper Union within a reasonable budget and be able to implement the solutions in a very active environment. Our approaches and solutions were many but the key ones included the following:

- * Addressing some space and sustainable issues, we replaced the two existing steam chillers with two new green electric-drive chillers in the same location as the original chillers and then tied the new chillers into the existing multi-stack units for operation during shoulder season. Cooper Union now had energy efficient sustainable chillers and will be able to recover heat from the multi-stack units to make additional chilled water.

- * Conforming to Landmark requirements and limited space considerations, we built a small custom roof-mounted mechanical equipment room (MER), not visible from the street, to house the three new low-nox condensing boilers and the new 200kw, gas-fired co-generator. To further avoid any equipment visibility, we installed two new low profile high efficiency induced draft cooling towers adjacent to the MER.

- * By replacing the chillers with the new electric drive equipment, we needed to determine how to provide a new refrigerant exhaust system that would meet ASHRAE 15 standards and Landmark's approval as well. Our solution was to run the new exhaust duct up an old abandoned shaft that was no longer being used.

- * One of our challenges was to design the systems so that they could be replaced on a fast track basis. In order to allow for the building to remain in operation, we prepared pre-purchased specifications for all the long lead equipment for the project. In addition we provided a 400-ton temporary chiller to provide chilled water while the chillers and cooling towers were being replaced.

It is also worth noting that there were some special features that were added to increase the efficiency of the building. Water-side free cooling was incorporated into the chiller plant to allow cooling without operating chillers during winter and spring/fall colder temperatures. A centralized DDC control system integrated the building with the entire campus wide control system enabling peak efficiency operation.

Although numerous challenges existed collaborative innovative approaches produced the solutions to bring this historic Landmark up to and beyond today's standards.

The project team was as follows:

- * Owner: Cooper Union
- * Construction manager: Source One
- * Architect: Gruzen Samton Architects
- * Mechanical, electrical plumbing and fire protection engineer: Jacob Feinberg Katz & Michaeli CG
- * General contractor: F. J. Sciame