

Air curtains draw comfort to the masses at McCormick Place ²¹⁷⁶⁷ _{P. 13}

▶ Deciding whether air curtains were cost efficient for the many huge loading dock door openings at Chicago's new \$850 million McCormick Place West convention center addition was an easy decision.

When officials of the Metropolitan Pier and Exposition Authority (MPEA), which owns and operates the facility, were presented with energy conservation estimates of \$70,000 annually and equipment cost payback of less than two years, choosing air curtains was a sure thing. In fact, air curtains were one of several energy conserving technologies that helped the project achieve two of its LEED® points from the USGBC in the "Optimized Energy Performance" category.

LEAVING THE DOORS OPEN

The mammoth exposition facility has more than 375 linear ft of freight and pedestrian doors typically open 10 to 14 hours daily dur-



Chicago's new \$850 million McCormick Place West convention center addition used air curtains at its loading docks to help maintain comfortable temperatures, provide annual savings, and achieve two of its LEED® points from the USGBC in the "Optimized Energy Performance" category.

ing the required five to seven days of setup prior to major winter events. Energy savings were calculated using a 26-week heating season with each door open 10 hrs weekly for a total of 260 hrs annually, according to David A. Johnson, engineering manager with Berner International Corp., which supplied the air curtains and accompanying controls.

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"Besides the annual savings and payback, we also calculated the hourly savings of \$269.79 when all the doors are open simultaneously," said Johnson, who uses Berner's proprietary software to crunch numbers on more than a dozen site conditions to calculate energy savings.

Aside from the energy savings, air curtains also have an impact on indoor air comfort in the facility's 470,000 sq ft of open exhibition space. "Without the air curtains on all large roll-up doors and man doors, the temperature would drop dramatically during set-up/tear-down and it would require a minimum of 24 to 48 hours to regain the target temperature of 73°F to 75° for an event," said Susan Van Klompenburg, senior mechanical design engineer with A. Epstein & Sons International, Inc., which performed consulting engineering for the expansion as a member of the joint-venture, McCormick Place Design Team, Take II LLC (Chicago).

Take II specified Berner's commercial-grade AFA and AFB models for pedestrian entranceways and smaller roll-up freight doors, while the industrial-grade Series CFC models serviced larger door openings ranging from 16 by 20-ft to 20 by 20-ft.

NOT FOR THE BIRDS

All of the McCormick Place West air curtains take air from inside the facility and discharge it through Berner's proprietary nozzles which were factory-aligned to produce a non-turbulent airstream that meets the floor approximately at the threshold of the door opening when opposed upon by the wind. Approximately 70% to 80% of the air returns to the space. Factory-installed hot water coils heat the air before discharging. The control of the interior/exterior air exchange saves energy, plus the discharge velocity, which ranges from 3,000 to 6,500 ft/min, keeps insects and deters birds from entering.

Because air curtains aren't as effective in negative pressure buildings, McCormick Place West's .125-in. positive pressure is ensured with a Building Automation Products Inc. outdoor air pressure sensor monitored by the BAS installed by Great Lakes Controls. The pressurization is achieved by balancing the dozens of Hartzell Fan Inc. roof-mounted exhaust ventilation fans, with the total supply air from 70 Trane air handlers located throughout the facility.

"It's vital that the discharge air of each air

curtain reaches the floor — especially on McCormick Place West's huge 20-ft-high openings for an effective split [air barrier between indoor and outdoor air] to occur," said Rob Williamson, president of Williamson & Co., a Berner manufacturer's representative. "Without the proper discharge velocity, angle, and building pressurization, any air curtain's effectiveness is minimized."

Without air curtains the exhaust fans would be drawing cold air through the open doorways, since they must operate during set-up and tear-down to remove forklift diesel fumes that affect IAQ.

The building's central plant hot glycol loop supplies the air curtains' hot water coils via three Cleaver-Brooks 1,200-hp boilers, four 125-hp horizontal suction pumps, and four Bell & Gossett shell-and-tube heat exchangers.

Installed by the project's mechanical contractor, Climatemp/F.E. Moran Inc., the air curtains are activated automatically by Berner relay door switches when their respective doors are opened or controlled by a thermostat depending upon the location in the building. Besides the air curtains, Take II's inclusion of ABB Inc. VFDs on a majority of the motors, plus the use of building envelope materials with high R-values, all contributed to the LEED accreditation. 3