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Air Conditioning For A Datacom Room Expansion Using Integrated Project Delivery

This month's Facility File will focus on the B2B April test for an HVAC application within a financial investment facility that is doubling its datacom room to accommodate a critical business environment. As a rule, owners and operators of large datacom spaces are very knowledgeable about the HVAC infrastructure that is required to assure the correct space environment. Still, it would be very beneficial for these individuals, along with the rest of the IPD (integrated project delivery) team, to read chapter 19 (Data Centers and Telecommunication Facilities) in the 2015 *ASHRAE Handbook — HVAC Application* to refresh their knowledge of ASHRAE's guidelines when preparing to authorize the design of a datacom room CRAH (computer room air-handling) unit expansion. The owner's facility management group should also read chapters 36 through 43 of the 2015 Handbook to assist in preparing the increased chilled water system demand of these CRAH unit operation and management design guidelines. This information combined with the owner's own knowledge of operating this type of room will assist the IPD team in understanding intricacies of owning, operating, and managing this datacom expansion project. It is also recommended that the owner-design team read chapter 59 of the same *ASHRAE Handbook* titled *HVAC Security*.

With all these design guidelines from ASHRAE, the IPD team — consisting of owner; building facility manager; owner representative/commissioning and air and water balancing consultant; HVAC consultant engineer; architect; electrical, plumbing, telecommunication, fire protection, and security subconsultants; general contractor; and HVAC, electrical, and telecommunication subcontractors — should meet with the owner's O&M staff to discuss specific building standards that need to be applied to this project. For this project, the facility operation is an in-house staff and not an outsourced group, and they will want to assure there are adequate contract specification requirements included pertaining to O&M, training, PM work order system, and energy operating budget.

In the Phase 3 Concept Development of the IPD project, the building manager and his O&M staff will want to contribute information to the design team member's writing of the contract specification and, more specifically, regarding the following activities: service contracts, parts inventory, and as-built drawings requirements. Reviewing the design documents, this O&M staff will want to be assured that equipment serviceability is adequate and safe and is similar to the existing CRAH units within the existing datacom room.

For the April B2B, the project delivery method is integrated project delivery (IPD) working together with owner-designer-builder. This project in design is based on a building program construction budget, so the general contractor and his in-house engineering and estimator (along with the prime subcontractors) will be involved in the design phase and be able to contribute to the contract documents. In the construction phase, the O&M staff will want to revisit the issues noted above during the design phase. Next comes the startup and commissioning phases. The O&M staff will want to be proactive in following along with the IPD team's mechanical-electrical in-house coordinator and the subcontractor's startup personnel, making sure to receive equipment training from the CRAH startup technician as well as system training using the O&M manuals and contract drawings (that will eventually become the as-built drawings).

Once the startup has been completed and the ATC subcontractor and owner representative/3rd-party commissioning and CxTAB consultant have completed the chilled water and CRAH air distribution balancing work, the HVAC subcontractor shall go through an automatic control system initial dry-run demonstration prior to the general contractor and his subcontractors demonstrating the system to the CxTAB consultant. The ATC subcontractor should also begin collecting system performance by trending pertinent HVAC system and equipment data including the following:

- room dry bulb and wet bulb temperature
- supply air and return air dry bulb and wet bulb temperatures
- chilled water supply and return temperature
- hot-aisle temperatures
- rack-based containment temperatures
- alarms
- CRAH control points
- offsite CRAH manufacturer's interface.

Taking the same approach as the design engineering, the owner's O&M personnel should use a series of computer-generated touchscreen project checklists that allows his staff to confirm that the following facility files have been collect. This process should start at the beginning of construction and not at project closeout, so that the facility files can be inputted into a CMMS system. Touchscreen O&M checklists should include:

- equipment shop drawings
- O&M manuals, parts list, and lubricants
- troubleshooting tips
- remote monitoring instructions

The O&M staff should review the contractor-produced piping and sheet metal field fabrication/field coordination drawings prior to fabrication. Touchscreen service checklists should include:

- location of shutoff valves, ATC valves, and balancing valves
- strainers
- equipment and control devices
- access for servicing equipment.

The training process should include specific HVAC system and equipment training but also emergency and security plan training due to security concerns (e.g., internet access). The hydraulic modeling of the entire system should be updated after the final TAB report. This will require the TAB subcontractor to provide the water balancing reports along with the associated system flow diagrams, noting quantities and pressures for rebalancing if necessary as part of the project close-out documents. Touchscreen training checklists should include:

- equipment
- system
- emergency plan
- automatic controls
- energy management