



## New Hotel Design-Bid-Build Project

This month's Facility File will focus on the B2B January test for hotels, motels, and dormitories described in the 2015 *ASHRAE Handbook — HVAC Applications*. It would be very beneficial for the hotel owner to read the *HVAC Application Handbook*, chapter 6, to be knowledgeable of ASHRAE's guidelines when preparing to authorize the designing a hotel.

The owner's facility management group should also read chapters 36 through 43 to assist in preparing the building operation and management design guidelines. This information should be combined with the owner contracting a local HVAC service contractor with routine quarterly preventive maintenance to assist the design team in understanding intricacies of owning, operating, and managing these public places. It is also recommended that the owner-design team read chapter 59 of the same ASHRAE handbook titled HVAC Security, as well as consider having an infection control consultant to provide construction and post construction assistance pertaining to in-house worker and hotel guest health safety.

With all these design guidelines from ASHRAE, the engineer should meet with the owner and her maintenance, custodial staff, and the local HVAC service provider to discuss specific building standards that need to be applied to this project. If the owner were to outsource the on-site management, the design team needs to know this in advance to adjust their contract specifications pertaining O&M, training, PM workorder system, and energy operating budget. One resource pertaining to O&M is AFE (Association of Facility Engineers) for HVAC operation and maintenance.

In the design phase of the project, the hotel owner and her technical staff will want to contribute information to the design team's writing of the contract specification and more specifically the following activities: service contracts, parts inventory, and as-built drawing requirements. Reviewing the design documents this O&M initiative will want to be assured that equipment service-ability is adequate and safe (e.g., how does a maintenance technician access the roof to replace filters at the air handling unit?).

For a building program as well as a business plan, to successfully manage a chain of mid-size hotels it is imperative that the program include an O&M budget in addition to the program's construction budget. Fifteen percent to 20% of the cost of a building is first cost, and 80% or more of the cost to own a building is in the O&M of the building over its lifespan.

For this January B2B, the project delivery method is design-bid-build, so the contractor and his subcontractors will not be involved in the design phase and not be able to contribute to the contract documents. In the construction phase, the owner will want her technical staff to revisit the issues noted above during the design phase. Next comes the startup and commissioning phases, and the staff will want to be proactive in following along with the contractor's startup personnel and receive equipment training and 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 TAB subcontractor have completed their work, the HVAC systems should go through an initial dry-run system demonstration prior to the contractor demonstrating the system to the TAB/Cx engineer consultant. The ATC subcontractor should also begin collecting system performance by trending pertinent HVAC system and equipment data by trending the following:
<input checked="" type="checkbox"/> outdoor air temperature <input checked="" type="checkbox"/> space temperature <input checked="" type="checkbox"/> occupied and unoccupied periods <input checked="" type="checkbox"/> alarms <input checked="" type="checkbox"/> boiler control points <input checked="" type="checkbox"/> discharge air and return air temperature
Taking the same approach as the design engineer, the hotel owner should provide a touchscreen tablet for her staff to use a series of computer-generated project checklists that allow her and her staff to confirm that the following facility files have been collected. 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:
<input checked="" type="checkbox"/> equipment shop drawings <input checked="" type="checkbox"/> O&M manuals, parts list, and lubricants <input checked="" type="checkbox"/> troubleshooting tips <input checked="" type="checkbox"/> seasonal startup and shutdown 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:
<input checked="" type="checkbox"/> location of shutoff valves, ATC valve, and balancing valve <input checked="" type="checkbox"/> strainers <input checked="" type="checkbox"/> equipment and control devices above ceilings and in walls <input checked="" type="checkbox"/> volume dampers, automatic dampers, fire dampers, and smoke dampers <input checked="" type="checkbox"/> access for filter, coil, and fan shaft removal
The training process should include specific HVAC system and equipment training but also emergency, security, and infection control plans training due to the hotel being a public place. The air balancing of the individual AHUs should be included in the PM workorder system to routinely assure continuous IAQ. This will require the TAB subcontractor to provide the air and water balancing reports along with the associated system flow diagrams, noting quantities and pressures for rebalancing if necessary as part of the project closeout documents. Touchscreen training checklists should include:
<input checked="" type="checkbox"/> equipment <input checked="" type="checkbox"/> system <input checked="" type="checkbox"/> emergency plan <input checked="" type="checkbox"/> automatic controls <input checked="" type="checkbox"/> energy management