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New Movie Theater Design-Bid-Build Project

This month's column will focus on the B2B January test for Places of Assembly described in the 2015 *ASHRAE Handbook — HVAC Application*. It would be very beneficial for the theater owner to read the HVAC Application Handbook, chapter 5, to be knowledgeable of ASHRAE's guidelines when preparing to authorize the public theater design.

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, combined with the owner's own knowledge of operating a theater, will assist the design team in understanding intricacies of owning, operating, and managing these places of public assembly. It is also recommended that the owner-design team read chapter 59 of the same ASHRAE handbook, titled *HVAC Security*, and consider having a security consultant on board to contribute to a safer building design.

With all these design guidelines from ASHRAE, the engineer should meet with the theater owner's facility management/maintenance manager to discuss specific building standards that need to be applied to this project. If the theater on-site management is going to be outsourced, the design team needs to know this in advance to adjust their contract specifications pertaining to O&M, training, preventive maintenance work order system, and energy operating budget. One resource pertaining to O&M is BOMA (Building Owners & Managers Association).

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

For a building program, not to mention for a business plan, to successfully manage a chain of movie theaters, it is imperative that the program include an O&M budget in addition to the program's construction budget. Fifteen to 20% of the cost of a building is first cost, and the remaining 80% or more of the cost of ownership is in the O&M over the rest of the building's life.

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 facility manager and her technical staff will want 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 in receiving equipment training and system training using the O&M manuals and contract drawings (which will 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 commissioning engineer. The ATC subcontractor should also begin collecting system performance by trending pertinent HVAC system and equipment data by trending the following:

- outdoor air temperature
- boiler control points
- space temperature
- discharge air and return air temperature
- occupied and unoccupied periods
- alarms

Taking the same approach as the design engineer, the facility manager should use a series of computer-generated touchscreen project checklists that allows her and her staff to confirm that the following facility files have been collected and correct. 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
- seasonal startup and shutdown instructions
- O&M manuals, parts list, and lubricants
- trouble shooting tips

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
- equipment and control devices above ceilings and in walls
- volume dampers, automatic dampers, fire dampers, and smoke dampers
- access for filter, coil, and fan shaft removal
- strainers

The training process should include not only specific HVAC system and equipment training, but also emergency and security plan training due to the theater being a place of public assembly. The air balancing of the individual theaters should be included in the preventive maintenance work order system to routinely assure continuous IAQ for the public. 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:

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