



## 10. Commissioning and Facilities Management

This brief chapter on one of the most important aspects of tower renewal is intended to provide a framework of understanding rather than a comprehensive discussion. A number of authoritative references have also been provided to obtain further information and keep abreast of commissioning and facilities management standards and practices.

After the comprehensive tower retrofit has been completed, it is prudent to conduct proper commissioning of the HVAC system and any other mechanical or electrical systems that have been upgraded. This is usually the first facilities management task following the completion of a comprehensive tower retrofit project. The commissioning process is intended to ensure that all of the components work properly as a system, but it is also a practical means of having a commissioning agent, who is independent of the contractor, review the entire system for compliance with the engineers' specifications and manufacturer's installation instructions. Further, the commissioning agent can ensure all documentation is complete and organized for use in the facilities management process, including preparation of a proper maintenance plan. Ideally, the commissioning process occurs during the holdback period so that sufficient funds are available to correct any deficiencies in the event the installing contractor is not willing or able to complete the work according to the commissioning agent's instructions. This situation is best avoided by setting aside an allowance for inspection of the work on a periodic basis as it proceeds. Regardless of the arrangement, it is important to properly commission all systems to ensure safe and proper installation and operation.

Facilities management can be simply defined as a means of maintaining the building and all of its sub-systems, components and equipment in safe and proper operating order by conducting routine maintenance to achieve optimal performance and service life. In some cases, owners act as their own facilities managers, while in other cases this role is assigned to professional service providers, often known as property managers. Property managers may also act on behalf of the owner in landlord/tenant transactions and relations. In addition to possessing the necessary qualifications and experience, facilities managers must be able to maintain good working relationships with owners, tenants and the numerous trades that will help maintain a good building service condition. Commissioning is among the first of several critical tasks that must be undertaken by the facility manager after the comprehensive retrofit work has been completed, and the process must be coordinated with the designers and contractors.

### Note on Information and Documentation Coordination

Commissioning and facilities management must be carefully coordinated with the design team, and the condition assessment process. The documentation assembled during the condition assessment must be transmitted to the design team, who in turn must pass on this and all design drawings and specifications to the facility manager (owner). Requirements for contractors to provide all installation and operating instructions, warranties and service contacts, and to cooperate during the commissioning process must be embedded in the contract documents, and followed up during contract administration. All of the historical and comprehensive retrofit information must be assembled in an orderly fashion and properly archived for future reference. Thorough commissioning and effective facilities management cannot be achieved unless all of this information and documentation is well organized and made accessible immediately following the substantial completion of a tower retrofit project.

## Commissioning

It is not possible to review the extensive procedures and checklists associated with commissioning, but these are published and available from several recognized sources of information for building commissioning. The most widely recognized guideline for HVAC systems is:

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) *Guideline 1-1996: The HVAC Commissioning Process*. These may be purchased online and downloaded from ASHRAE directly.

There are a number of useful resources available free of charge. A complete guideline for building commissioning may be downloaded from:

[http://www.energydesignresources.com/Portals/0/documents/DesignGuidelines/EDR\\_CommissioningHandbookComplete.pdf](http://www.energydesignresources.com/Portals/0/documents/DesignGuidelines/EDR_CommissioningHandbookComplete.pdf)

Recently, a best practices guide was published and made available online.

*Best Practices in Commissioning Existing Buildings*. Building Commissioning Association, Portland, Oregon, August 18, 2008.

<http://www.bcxa.org/downloads/bca-ebcx-best-practices.pdf>

### Recommended Minimum Qualifications

Comprehensive retrofits on tower apartment buildings are not as common as new building construction, hence it is important to select a commissioning agent who is suitably qualified and experienced. The recommended minimum qualifications are outlined below to assist in selecting a suitable commissioning agent:

- Experience in design, specification or installation of commercial/institutional building systems including HVAC, mechanical, electrical, lighting, communications, control systems and other systems being commissioned.
- History of responsiveness and proper references (at least 3 positive references).
- Meets owner's liability requirements.
- Experience working with project teams, managing projects and conducting scoping meetings.
- Experience commissioning at least two projects of similar size and of similar equipment to the current project; one in the last three years. This experience includes the writing and execution of verification checks and functional test plans.
- Experience in design installation and/or troubleshooting of direct digital controls and energy management systems, as applicable.
- Demonstrated familiarity with metering and monitoring procedures.
- Knowledge and familiarity with air/water testing and balancing.
- Experience in planning and delivering O&M training.
- Overall understanding of all building systems including building envelope, structural and fire/life safety components.

The importance of proper commissioning cannot be overstated and this should always be performed by someone other than the installing contractor.

## Facilities Management

This section deals exclusively with those aspects of facilities management pertaining to the proper operation and maintenance of buildings, facilities and grounds. To put the role of the facility manager into perspective, a typical 200-unit tower apartment building has an approximate value of \$50-million, likely more depending on its location and features. A comprehensive tower retrofit adds between \$5 and \$10-million to this asset and it is intended to extend the useful service life by 50 years. There are few assets having this value today, for example jet airliners, that would not require a highly qualified professional to operate and manage them. The business plan for every tower renewal project hinges on achieving an estimated level of operating cost savings, and maintaining the overcladding and window replacements in good condition over the projected service life. Facilities managers must deliver the best achievable performance from comprehensive tower retrofit to ensure a reasonably attractive return on the investment.

Facilities managers are usually assisted by a superintendent and a janitorial staff, hence their primary focus is on establishing an effective framework for operations and maintenance. A key function is to establish an inspection and maintenance plan for the tower building. In order to gauge when maintenance or adjustment is required, it is necessary to develop performance indicators. When an assembly, component or item of equipment falls below the threshold established in the performance indicator, appropriate action must be taken.

Most performance indicators are visual, such as worn out floor finishes in lobbies and hallways. Others are quantitative and relate to energy and water consumption, solid waste disposal, and vacancy rates. Each of these must be closely monitored to reduce operating costs, minimize vacancy rates and identify corrective measures. Issues of health and safety take priority over aesthetic and are normally assigned the highest priority.

Preventive maintenance begins with daily inspections to the building, facilities and grounds. Figure 10.1 provides an example of a daily inspection list that should be carried out by the superintendent or designated staff.

### Daily Inspection Checklist

- water pipes and pumps
- gates and locks, fire doors and closers
- intercoms and TV signaling, lights and fittings
- hose reels, nozzle boxes and alarm glass
- letter boxes and storage lockers
- security TV and cameras, timer switches
- surface water channels, drains, manholes covers
- club facilities, swimming pools, saunas
- flower beds and planters, playground equipment
- staircases, lobbies, laundry rooms
- mechanical and electrical rooms, elevators
- underground parking, lighting and ventilation
- building structure, cladding, windows and finishes

**Figure 10.1.** An example of daily inspection checklist to be performed by the superintendent of a typical tower building. Note that not all of the items may necessarily apply to a particular building, such as club facilities and swimming pools.

The daily inspection is often carried out informally as a part of regular housekeeping procedures, but it is advisable to keep a formal reporting system in place, at least once a week, so that a record of the conditions is available for reviewing and adjusting maintenance schedules.

In addition to daily inspections, there are seasonal inspections and special inspections. An example of a seasonal inspection is checking the underground parking ramp de-icing system prior to winter. Figure 10.2 highlights critical special inspections for tower buildings.

### Special Inspections

- fire safety
- emergency power
- HVAC system
- elevators
- building envelope and balcony guards

**Figure 10.2.** Special inspections are periodic and in some cases these are determined by regulatory authorities, in other cases by equipment manufacturers and/or the commissioning agent. The condition assessment and design processes will usually provide recommendations on the inspection of the building envelope and balcony guards.

It remains the responsibility of the owner to provide sufficient resources to carry out required maintenance and address any deficiencies identified during the inspection process.

Effective facilities management of tower buildings, facilities and grounds requires proper resources and organization to ensure the following:

- Proper housekeeping procedures;
- Comprehensive maintenance plan;
- Daily, seasonal and special inspections;
- Monitoring of energy and water consumption;
- Management of solid waste, recycling and composting;
- Record keeping and strategic planning; and
- Mechanisms for obtaining tenant feedback.

For additional information on facilities management and helpful resources for the management and maintenance of multi-unit residential buildings, consult the following:

*TowerWise Program*, Toronto Atmospheric Fund <http://www.towerwise.ca/>

*HIGHRISES AND MULTIPLES*, Canada Mortgage and Housing Corporation  
<http://www.cmhc-schl.gc.ca/en/inpr/bude/himu/>

Housing is a resource that must be monitored and maintained to ensure its continued health and viability. Readers of these guidelines are urged to conserve our precious housing resources through better design, retrofit, commissioning and especially, facilities management practices.

