Facilities Condition Assessment
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Introduction

Facilities condition assessment is the process of developing a comprehensive picture of physical conditions and the functional performance of buildings and infrastructure; analyzing the results of data collection and observations; and reporting and presenting findings. This chapter provides the tools needed to conduct a facilities condition assessment, guidelines to report assessment findings, and advice to present a persuasive case for the need to fund capital renewal and deferred maintenance.

The Facilities Condition Assessment

Objectives

The main objective of the facilities condition assessment is to measure the condition and functionality factors that make both the building and its infrastructure of adequate condition and appropriate for intended functions. Specific objectives of the comprehensive assessment methodology include determining needs for renewal or replacement of building and infrastructure subsystems, and guiding the analysis of good decision options for the renovation or modernization of capital project planning.

Purposes

Specific purposes of a well-designed assessment are as follows:

- Provide an inspection of all facilities identifying deficiencies
- Assist in defining regular maintenance requirements
- Define capital renewal and replacement projects to reduce deferred maintenance backlog
- Eliminate conditions that are either potentially damaging to property or present safety hazards
- Identify energy conservation measures
- Inventory accessibility and disabled persons requirement
- Develop cost estimates and schedules to correct deficiencies and for capital renewal or replacement, and renovation or modernization projects

Scope

The traditional method of assessing existing buildings and infrastructure (commonly known as the Facilities Audit) is limited to physical deficiencies in building and infrastructure systems and subsystems, as well as to compliance deficiencies with applicable codes and conformance with the Americans with Disabilities Act (ADA). The methodology used in this chapter integrates the Physical Condition Assessment with a Functionality Assessment. The latter assessment comes from a user perspective, rather than from a building perspective, and is aimed at understanding how well the space functions, its suitability for its current (or other) purpose, and its potential for alternate uses.

The two approaches are undertaken to constitute a comprehensive evaluation of facilities.
conditions and then are combined as follows:

- **Physical Condition Assessment (or Life-Cycle Modeling, or both)**: Physical condition of the building and infrastructure system

- **Functionality Assessment**: Functionality of the space for its intended programmatic purpose

The integration of these elements provides for a comprehensive evaluation of existing facilities. As inputs to a Capital Facilities Project Plan, these elements provide a broader set of decision options, including the following:

- Facilities renewal for individual condition deficiency remedial projects
- More comprehensive renovation projects, including work to correct subsystem condition deficiencies and to improve functionality
- A replacement project and downgrade of an existing building to a less demanding use (e.g., replacement of a new science lab building and conversion of an old science building for office or classroom use)
- Demolition or disposal

### Condition -- Full Physical Condition Assessment versus Predictive Modeling

The physical condition assessment can be based on fully detailed inspections or on a predictive forecasting model based on life-cycle expectations, or on a combination of the two.

Physical condition assessment methodology has advanced from manual data entry on inspection forms to sophisticated data-gathering and analytical techniques. A sophisticated physical condition assessment, based on building inspections and data collection from other sources (interviews with maintenance staff, maintenance records, and feasibility studies), permits detailed cost estimating. Thus, results of an assessment based on field inspections can be translated directly into projects and assembled for sorting into a capital projects plan.

An alternative to comprehensive building and infrastructure subsystem inspections is a predictive model of capital renewal needs, usually for a minimum 10-year period using statistical methods. Forecasting is based on building system life cycles and remaining useful life-of-building and infrastructure subsystems (such as mechanical, plumbing, electrical, elevators, and roofs). The forecast produces a calculation of the scheduled year for system renewal and estimated renewal cost. The total cost to restore various subsystems when life cycles expire are calculated on an annual basis and can be averaged over a period of time to determine annual capital renewal expenditures.

The relative cost of these two alternatives is an important issue in selecting a methodology. The two methodologies detailed condition assessment or predictive life-cycle modeling vary widely in cost and results. In 2009, the statistical life-cycle modeling technique is likely to cost less than 20 percent of the cost of performing a full-field inspection condition assessment. In addition, life-cycle modeling requires less time to produce findings, approximately half the time of a detailed condition assessment. Both techniques depend on in-house staff input to varying degrees. A benefit of an outsourced condition assessment that is based on detailed field inspections is access to experienced inspection teams which addresses the challenge of having insufficient campus staff resources to complete the task and enhances the reliability of deficiency and project cost estimates.

The experience of higher education institutions, public agencies, and the private sector is that a combination of the condition assessment and predictive modeling addresses trade-offs in cost, delivery of findings on a timely basis, effective use of in-house staff time and knowledge of plant conditions, and data-updating requirements.

Conversely, a relatively inexpensive and rapidly performed predictive life-cycle model is most useful for macro-level capital planning and budgeting. This model can provide estimates of
deferred maintenance needs and future facility renewal. Especially for an institution that has, or
wants to establish, an aggressive annual renewal program, the predictive modeling approach
calculates the stream of annual funding required to meet forecasted needs. On the other hand, the
detailed condition assessment provides voluminous documentation for capital project justification
and project planning. When a life-cycle predictive model is selected as the primary source for
capital project planning, projects and estimated project cost should be verified by disciplined field
inspection of a minimum of 10 percent of an institution's facilities.

**Intended Users**

The information gathered in the facilities condition assessment is intended for various users:

- **Senior Campus Administrators.** The assessment supports a consistent presentation of
  facilities deficiencies, leading to better priority setting when funding is limited. Long-term
capital budgeting and planning to eliminate deferred maintenance and maintain facilities in a
functionally usable condition are served by the assessment.

- **Governing Boards.** The assessment provides information to governing boards concerned
  with the condition of buildings and infrastructure and the formulation of long-term capital
  project planning.

- **Facilities Managers.** The assessment will provide information for routine maintenance, major
  maintenance, capital renewal, and renovation project planning. The inspection procedures
  and forms can implement a routine process for observing deficiencies and incorporating
  them into maintenance planning. The facilities assessment will help the facilities management
  staff communicate with the administration; facilities problems that were avoided in the past
  can be presented objectively to senior administrators by the facilities assessment.

- **Team Specialists.** The facilities assessment will enable consulting architects, engineers, and
  other specialists to gather data on building and infrastructure systems and components
  related to their disciplines. The information needs of the entire facilities team can be
  identified and used with more objectivity with the assessment data; this information should
  make it easier to study the overall building and infrastructure needs of the institution.

**Applying the Assessment**

Circumstances may differ between institutions that undertake a comprehensive survey of all
facilities for the first time and those that have a specific set of goals for determining existing
conditions. The basic principles presented here can be used for all levels of institutions, for a
single structure, or for an institution's entire space inventory. Facilities managers should
incorporate the special characteristics of the institution and its facilities into an individualized
facilities condition assessment.

To be successful, a facilities condition assessment program requires the support and involvement
of senior administrators to ensure the credibility of findings and conclusions, thus enhancing the
probability that financial resources will be allocated. This important factor in acceptance or
rejection of a costly and time-consuming assessment process hinges on understanding the
process and preparing for funding approval of a major capital expenditure program.

Careful design of a facilities condition assessment enables the facilities manager to determine the
level of information to be obtained and to ensure that the information gathered is appropriate for
the intended application of findings and conclusions. The approach selected must be driven by
the nature of an organization's facilities, budgeting methods, and organizational structure. Formats
for reporting assessment findings should be tailored to match the input requirements for the
maintenance work order system and the capital budgeting and planning processes.

The assessment process can be conducted as a self-evaluation program using in-house staff or by
consultants, or by a combination of both. Although a self-evaluation program may produce valued
results, external consultants add credibility to the assessment. For this reason, the institution must weigh the value of engaging outside consultants against conducting an assessment using only in-house staff.

As the facilities manager and staff gain experience with the assessment process, they will recognize the potential benefits to becoming familiar with building and infrastructure conditions, documenting observations for maintenance planning, and planning for capital projects. The assessment process contributes to the overall effectiveness of the facilities management organization by ensuring that condition inspections are a routine part of operating activities.

Assessment Phases

Assessment process phases are shown in figure 1. The first three phases designing the assessment, collecting data, and summarizing the results provide the data on maintenance deficiencies and functional performance. This assessment is followed by a presentation of findings. In this systematic approach to a facilities assessment, the scope of the assessment is first determined, the assessment team is selected, and the inspection is planned. Next, data are collected through building and infrastructure inspections and functional performance evaluations. Finally, the information from these inspections and evaluations is summarized, priorities are set, and results are presented.

Figure 1. Facilities Condition Assessment Phases

<table>
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<th>PHASE ONE</th>
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<tbody>
<tr>
<td>Designing the Assessment</td>
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<tr>
<td>• Determine assessment scope</td>
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<tr>
<td>• Select assessment team</td>
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<tr>
<td>• Plan inspections</td>
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<tr>
<th>PHASE TWO</th>
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<tr>
<td>Collecting Data</td>
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<tr>
<td>• Prepare inspection forms</td>
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<tr>
<td>• Develop functionality criteria</td>
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<tr>
<td>• Conduct inspections</td>
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<td>• Prepare findings and conclusions report</td>
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<th>PHASE THREE</th>
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<tr>
<td>Summarizing the Results</td>
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<tr>
<td>• Evaluate inspections</td>
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<tr>
<td>• Prepare summary reports</td>
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<tr>
<td>• Compile data</td>
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<tr>
<td>• Plan future assessments</td>
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<th>PHASE FOUR</th>
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<tr>
<td>Presenting the Findings</td>
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Physical Condition Assessment

A physical condition assessment identifies condition deficiencies and determines the necessary actions to bring the building or infrastructure back to its original condition and to meet current codes. The assessment records observed conditions and determines remedial projects to correct deficiencies, including the following:

- Deficiencies in a critical category, that is, those requiring action in the next 12 to 24 months (usually as backlog or expected current year expired life)
- Future capital renewal projects, that is, those prioritized for the next two to five years.

Conducting a physical condition assessment requires a clear set of objectives before committing staff and financial resources. Whether a campus has previously conducted a condition assessment or is beginning one for the first time, thorough preparation is needed to ensure understanding and support of all staff involved in the process. Management and inspectors must collect reliable data, identifying deficiencies as objectively as possible.

A condition assessment can be comprehensive, collecting information on building and infrastructure subsystems and functional performance for all facilities; limited to a functional area, such as housing or athletic facilities; or selective for specific building subsystems, such as roofs; or specialized for safety or new regulatory requirements.

A hallmark of a successful assessment program is the introduction of a culture of observing and reporting conditions, not on a one-time basis, but as a regular part of supervisory and trades activities. Inspection planning includes this process of continually observing and reporting deficiencies, and flowing results into maintenance work and capital project planning.

Designing the Assessment

Building and infrastructure inspections represent a significant commitment of resources. The assessment design should be prepared to adjust staff schedules for in-house inspectors and allow adequate time for managing consultants when they are used. Direct costs must be budgeted for reproducing plans, preparing building histories, performing laboratory testing, and producing other information. If consultants are used, their costs must be budgeted as well. Thorough preparation, including staff training, will ensure the usefulness of facilities assessment results.

Finally, an overall completion date of any deadlines for finishing inspections and assessing results should be factored into the scope to ensure timely completion of accurate reports. Thorough planning of inspections enables observed deficiencies and costs for corrective measures to flow directly into maintenance work orders and capital project planning.

Scope Determination

A checklist for determining an assessment's scope includes the following:

- Define assessment goals and objectives
- Determine the inspection methodology
- Define the intended use of results, and determine report formats
Select the assessment team
Prepare a list of the facilities and components to be assessed
Review available information on facilities to be inspected
Establish deadlines, availability of staff, and access to facilities

Goals and objectives can include determining a threshold for major and minor maintenance, evaluating deferred maintenance reduction programs, prioritizing capital project guidelines, and providing cost estimates and schedules for capital renewal or replacement and renovation projects. The choice of specific facilities to be inspected depends on the assessment's goals and often is influenced by deadlines, available resources (staff and budgets), building access, and seasonal conditions.

Preferably, the condition assessment is repeated on an average three-year cycle. Although all facilities can be included, the condition assessment can be omitted for buildings in temporary use; buildings below a size threshold; or nonessential campus structures. Unique facilities with special structural systems or a high level of public use, such as arenas, performing arts complexes, or convocation centers, may warrant inspections at more frequent intervals. In practice, institutions with a comprehensive baseline of conditions can compile information on a "rolling" basis with updated information entered periodically.

Selecting the Assessment Team

Once the assessment scope has been determined, the team leader and team members are selected. An assessment team leader should be identified to guide the process from start to finish, supervise database preparation, select team members, schedule the assessment, assign team members, monitor progress, and report findings and recommendations. The team leader should be able to prepare written reports, be skilled in inspection techniques, be capable of estimating and planning, be knowledgeable of maintenance practices and standards, and have good oral communication skills.

The number of physical condition assessment team members and qualifications vary with the amount of space and complexity of building and infrastructure to be inspected. Team members can include architects as well as structural, mechanical, and electrical engineers. Complex inspections can require landscape architects and specialists, for example, in code requirements and conveying equipment. A familiarity with facilities operations and maintenance (O&M) procedures is useful to ensure that inspections and assessments encompass the practical aspects needed for work orders and capital projects. Knowledge and skills in installation and maintenance of a subsystem are important when selecting an inspector and evaluating the qualifications of a consulting team.

The choice to use in-house staff or consultants has advantages and disadvantages. In-house personnel are most familiar with the facilities to be inspected. Maintenance supervisors or facilities planning staff that work with facilities on a routine basis have access to O&M information and can readily use existing knowledge of deficiencies. However, the conflict of performing current assignments often places in-house staff in the role of part-time inspectors who must defer inspection assignments or interrupt scheduled tasks. Thorough training of in-house staff can overcome the lack of inspection experience, provide uniformity and consistency of inspections, and contribute to the success of an assessment. Training should be conducted formally and should cover the inspector's role and importance of the inspection, completion of forms and use of results, and inspection techniques.

Consultants are recommended when in-house staff are unavailable for inspection assignments. Advantages include completion of a physical condition assessment on a timely basis and objective inspections and reports. Consultants leave in-house staff free to perform their regular assignments. Consultants can offer specialized technical knowledge for diagnosing
problems, recommend corrective measures, and estimate maintenance and capital projects. However, the assessment scope must be carefully defined and monitored to manage costs and ensure that results meet goals and objectives. Consultants' work should be organized to ensure that future assessments can follow a similar format, providing data that can be used for comparison in future inspections.

Data Sources

Condition assessment data sources include the following:

- A space inventory
- Building and infrastructure drawings
- Field inspections of buildings and infrastructure
- Observations from maintenance staff and records
- Building and infrastructure feasibility studies
- Proposed capital project reviews that incorporate condition deficiency remedial work

Assembling the information into a relational database provides accessibility to collected information and findings. Data may include a description of findings from inspections and other sources, preliminary prioritization of remedial work, images, and estimated costs.

Inspection Preparation

Thorough planning of the building and infrastructure subsystem inspections is essential to produce accurate, timely, and useful results. Several critical condition inspection factors pertain to scheduling inspections, inspection assignments, training, tools and equipment, notification to building occupants, and emergency work.

- **Scheduling Inspections.** Inspection schedules are determined by the overall inspection timetable; the number of facilities, their size and age, and the type of facilities to be inspected; staff availability; facility access influenced by usage and seasonal weather; and the nature and extent of involvement with key building personnel.
- **Inspection Assignments.** Assignments for in-house inspectors or consultants are made by the assessment team manager. Disciplines should be matched with the inspection assignment. For example, primary systems inspectors could include a team with architectural, structural, mechanical, and electrical engineering skills. Two or more staff members should inspect a facility together to ensure safety and to improve communications between inspectors (i.e., identifying and diagnosing problems, selecting priority classifications, and estimating costs).
- **Training.** Training in-house inspectors and consultants as to the inspection's purpose and schedule and proper use of the forms is essential to ensure uniform and accurate results. Knowing why, when, and how the assessment is to be conducted contributes to the quality of inspection results and develops interest and enthusiasm for incorporating inspections into regular plant activities and for reporting maintenance deficiencies. The facilities manager should recognize that staff may consider assessments to be an added burden to their normal assignments. The leadership of the facilities management department and the assessment manager should impress on the inspectors the importance of their tasks and their contribution to the overall organization's operation and mission.
- **Tools and Equipment.** An efficiently performed inspection requires inspectors to be prepared for a day in the field without returning to the base of operations unnecessarily. Generally included items include floor plans and inspection documentation equipment, hand tools to enable access to equipment, a digital camera, and a tape recorder (optional).
- **Notification to Building Occupants.** Building occupants should be notified before a scheduled inspection. A preliminary discussion with users or a survey soliciting information
can identify many problems before the inspection. Access to the building or any planned service disruptions for testing should be coordinated to avoid interrupting normal operations. Inspection tours conducted while a building is occupied can uncover deficiencies and identify possible corrective measures. Care should be taken to avoid implying that inspections and identification of deficiencies will result in a specific program of remedial actions. Inspection results and any management actions should be shared with building managers.

- **Emergency Work.** Procedures should be in place for promptly remedying any emergency conditions observed during the inspection. Assessment team members should be instructed in these procedures during training.

**Data Collection**

The condition inspection of a facilities assessment includes a visual inspection and record of observations of buildings and infrastructure systems and subsystems. The design of the inspection forms and the methodology followed are based on how a building or infrastructure is constructed and how inspectors would logically proceed to make observations, collect data on deficiencies, and determine costs of corrective measures. Building inspections begin with how a structure is placed in the ground; travel upward to structural framing, exterior wall enclosures, and the roof; and then move to the interiors. Each service subsystem heating, ventilation, and air conditioning (HVAC), plumbing, and electrical is inspected separately. A comprehensive physical condition assessment provides an inspection of the architectural, civil and structural, mechanical, electrical, and safety components of each facility. Infrastructure inspections are conducted in a similar methodical manner.

Data collection is based on the taxonomy of building assembly by systems in UNIFORMAT II for buildings. Classifications provide a commonly used outline for data collection and permit comparison between institutions, including Level 1-Major Group Element; Level 2-Group Elements; and Level-3 Individual Elements.

Figures 2 and 3 illustrate the Level 1 and Level 2 Group Elements for building and infrastructure.

**Figure 2. UNIFORMAT II Classification for Building Elements**

<table>
<thead>
<tr>
<th>Level 1 Major Group Elements</th>
<th>Level 2 Group Elements</th>
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</thead>
<tbody>
<tr>
<td>A. SUBSTRUCTURE</td>
<td>A10 - Foundations</td>
</tr>
<tr>
<td></td>
<td>A20 - Basement</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
</tr>
<tr>
<td>B. SHELL</td>
<td>B10 - Superstructure</td>
</tr>
<tr>
<td></td>
<td>B20 - Exterior Enclosure</td>
</tr>
<tr>
<td></td>
<td>B30 - Roofing</td>
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<tr>
<td>C. INTERIORS</td>
<td>C10 - Interior Construction</td>
</tr>
<tr>
<td></td>
<td>C20 - Stairs</td>
</tr>
<tr>
<td></td>
<td>C30 - Interior Finishes</td>
</tr>
<tr>
<td>D. SERVICES</td>
<td>D10 - Conveying</td>
</tr>
<tr>
<td></td>
<td>D20 - Plumbing</td>
</tr>
<tr>
<td></td>
<td>D30 - HVAC</td>
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<td>D40 - Fire Protection</td>
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</table>
A functionality assessment expands the traditional physical condition assessment to evaluate how well facilities are functioning for an assigned program. Although reference to a comprehensive approach combining physical condition and functionality appears in the facilities literature, application of the concept is, by far, the exception, rather than the rule. The functionality assessment answers the question: How well does the existing space meet contemporary functionality needs for the program it is supposed to serve?

The functionality assessment has a different focus than the physical condition assessment, and it takes into account factors of programmatic uses and requirements. The approach is not building system-based. It is directed toward the perspective of the building user, and it is based on data collected from an evaluation of user interviews and a set of functionality criteria relating to performance features of space. This assessment is done by space type (e.g., classrooms, teaching laboratories, research laboratories), rather than by building systems.

Methodologies to obtain reliable functionality information include user interviews and field inspections based on the use of functionality criteria, formulated for a comprehensive facilities condition assessment. Assessment team skills include experience and knowledge about pedagogy, state-of-the-art space configuration and equipment to fit specific programmatic needs, and technical space requirements. For example, the assessment team must be proficient in evaluating a
room designated for Chemistry 101 and determine whether it meets functionality criteria standards for contemporary functionality, or that locker rooms are contemporary and competitive with peers' facilities. Some issues surfacing in functionality interviews about the amount of space available, configuration, adjacency, appearance, security, and space comfort actually may be due to dissatisfaction with physical conditions, or may be the result of users' preferences. In sorting out these issues some real and some perceived the interviewees' opinion of the evaluator's qualifications must pass the test of credibility to gain confidence in final conclusions and recommendations.

The functionality assessment is tailored to the specific size and complexity of an institution. Assessment methodology enters the realm of objective analysis of quantifiable needs and subjective evaluation of "wish lists" obtained through field observations and group interviews. The information-gathering process is delicate because of the challenge to distinguish justifiable needs identified by space users that are potential "real" capital projects versus personal preference. Program evaluation is a sensitive issue and it demands respect from stakeholders for the interviewer's ability to understand program pedagogy, special requirements, and objectives. Perceived interviewer shortcomings can be supported by including a senior academic or administrative officer as an interview participant.

**Interviews**

User interviews, generally conducted with a group representative of a program or department, are structured by a protocol to discuss the following issues:

- Functional relationships
- Space suitability and functional adequacy
- Space condition and issues
- Other comments

Interview practice works well with a leader to focus on issues related to the interviewee's program or department space and a second person to assist in the discussion and serve as a note-taker. Interview notes should be recorded as accurately as possible and a transcript submitted to attending interviewees for comment. The final meeting notes are revised, as appropriate, and published as part of an interim report.

**Functionality Criteria**

Functionality assessment standards represent a common set of characteristics that are a baseline level for the conduct of a program. The specific nature of a program and facility usage will determine standards for space configuration, finishes, equipment, mechanical, electrical, lighting, communications, and other unique requirements. Generally, the focus is on major buildings of recent construction. Typical exclusions are as follows:

- Buildings less than 10 years old
- Buildings that have been comprehensively renovated or modernized within the last 10 years
- Residential facilities
- Minor structures

Functionality criteria are developed for the following categories (see the example for general classroom space in figure 4):

- Academic space (various types)
- Research laboratory space (wet and dry)
- Student and community support space

The evaluation format for the functionality criteria provides a record of the characteristics of a
A five-level rating system for functionality and adequacy (1 = Optimum, 2 = Adequate, 3 = Fair, 4 = Poor, and 5 = Unsatisfactory)

Specific evaluation comments are entered.

Evaluation comments and notes, with ratings, are used to calculate a project cost based on a judgment of the required scope of work. A cost template is developed with estimates for unit prices per square foot for similar spaces or for the entire modernization of an existing space.

Figure 4. Functionality Criteria - General Classrooms

<table>
<thead>
<tr>
<th>Space Type</th>
<th>General Classrooms</th>
<th>Evaluation</th>
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<tbody>
<tr>
<td>Characteristic</td>
<td>Baseline Functionality Criteria</td>
<td>Score (1-5)</td>
</tr>
<tr>
<td>1. Functional adequacy</td>
<td>Classroom configuration and the size and arrangement of student and instructional stations satisfies instructional requirements, and provides adequate sight lines.</td>
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<tr>
<td>2. Accessibility</td>
<td>Spaces shall meet ADA standards wherever required to meet program accessibility requirements.</td>
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<tr>
<td>3. Room finishes</td>
<td>Floors shall be covered in an appropriate, easily cleaned material that will permit the room to be maintained in a neat and orderly condition. Walls and ceilings shall be finished in appropriate, easily cleaned materials. Color schemes and finish materials shall present a pleasing appearance conducive to teaching and learning.</td>
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<tr>
<td>4. Acoustics and sound control</td>
<td>Floor covering, wall surface, and ceiling materials shall have appropriate sound absorption and reflective qualities, and insulation against outside noise shall be sufficient to provide a teaching, learning, study, or work environment free of distracting noise levels.</td>
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<tr>
<td>5. Climate control</td>
<td>Heating and cooling systems, together with adequate control systems, shall be installed that will permit the maintenance of a comfortable teaching, learning, study, or work environment at all seasons of the year.</td>
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<tr>
<td>6. Lighting</td>
<td>The installed lighting system shall provide an adequate quality and level of lighting for the teaching, learning, study, or work environment, and shall be provided with controls to vary or adjust the lighting level as required for specific needs. Appropriate classroom window coverings shall be provided to permit unimpaired use of A/V or other teaching equipment.</td>
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<tr>
<td>7. Electrical service</td>
<td>Adequate electrical capacity and outlets shall be provided in the room to accommodate teaching equipment, laptop computers, office equipment, etc.</td>
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<tr>
<td>8. Instructional support</td>
<td>As required, classrooms shall be equipped to support instruction, including: - Connectivity to campus data networks and the Internet - Chalkboards, whiteboards, projection screens, or other teaching accessories - A full range of audio-visual equipment</td>
<td></td>
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<tr>
<td>9. Furniture and fixtures</td>
<td>Classroom fixed seating, when installed, shall be ergonomically correct, maintainable, provided with adequate tablet arms or table space for note-taking, and shall provide an unobstructed view.</td>
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<tr>
<td>10. Information technology</td>
<td>All office spaces shall have appropriate connectivity to campus data networks and the Internet.</td>
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<tr>
<td>11. Storage space</td>
<td>An adequate amount of storage space for equipment and files appropriate to the function shall be provided.</td>
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**Bringing Together the Condition and Functionality Assessments**

A physical condition assessment (or combined with a life-cycle forecast model) and a functionality assessment provide two counterpart views of capital improvement needs for each building.
evaluated. These functionality findings may be provided in addition to the condition and code findings, and the cost estimates arising from the two assessments may be added together. For example, a condition assessment yielding $2 million of building system and code corrections including a new roof; exterior pointing, HVAC system upgrades, and so on is combined with a functionality review yielding another $2 million of interior space reconfiguration, for a total project need of $4 million.

In other cases, the findings of the functionality assessment may override a condition assessment project. For example, a condition assessment may find that some number of light fixtures in a series of classrooms are broken and require replacement. The functionality assessment may conclude that the entire lighting system is inappropriate for modern classroom requirements and may propose complete replacement of the lighting system. In such an event, the cost of replacement of some broken fixtures would be replaced by the cost of a project for a new lighting system.

The combined assessment findings can determine a policy decision for a building renovation or replacement by answering the critical questions: Is the facility suitable for its current use, or will it require remodeling? What is the actual cost of remodeling compared with a new building, and is relocation of programs to another building feasible and desirable?

For example, as a result of condition inspections, a building may be found to have significant deficiencies, with costs of corrective measures exceeding replacement value. However, for historic, aesthetic, or other reasons, the building may be retained for renovation and extended use. Major renovations resulting from the functionality assessment may include all identified priorities in a single capital project. In contrast, a facility may be considered for remodeling, but the institution may want to recommend demolition because of conflicts with plans for future land use or sale as a source of revenues.

**Completing the Assessment**

After completing data collection, the next steps in the facilities condition assessment process are to (1) evaluate the assessment process, (2) create a database of assessment findings, (3) update assessments, and (4) design reports to be produced from the database.

**Evaluating the Assessment Program**

Thoroughness and consistency are important considerations for the assessment team manager when reviewing assessment results. A random selection of findings and visits by the team manager can confirm results or suggest further evaluations. The team manager can judge the accuracy of cost estimates to a degree by independently performing sample estimates and comparing results and the methodology with those developed by the evaluator. The evaluator's subjectivity is a factor that should be considered when reviewing recommended projects for condition deficiency remedial work or functionality issues. The manager should suggest any needed improvements in the evaluator's training programs.

**Relational Database**

Assessment findings and conclusions provide a resource for assembling a Web-based relational facilities database. Figure 5 illustrates the various modules residing in the database, including modules for space information, maintenance management, project management, financial information, capital projects, human resource data, and graphic interfaces.
Policies and procedures for assessment updating are necessary to ensure the viability of data and information for knowledge-based facilities decision making at policy and operational levels. Candidates for updating dynamic information generally are in the form of data and information collected as inputs and findings generated by condition and functionality assessments. For example, space inventory changes recorded as the result of new construction or renovations are fed into the database and accessible for users. A cooperative venture between institutional information technology department and facilities management for database maintenance is a common technique to coordinate protocols for data management, security, and software updates.

**Updating Assessments**

Similar to database maintenance, policies and procedures should be established to extend the life of assessment data and information findings and conclusions. Some data and information are less dynamic than others; monthly, quarterly, and annual updates can be prioritized for maintaining a facilities database.

Policies and procedures for assessments should be managed and implemented by the facilities management organization or, in the case of outsourcing program management, by consultant(s). Basic data elements are updated annually or driven by specific information requests, such as a decision-making review of a capital project. Facilities condition assessment data should be updated on a regular basis for reliability and user confidence in timeliness of data.

**Facilities Condition Assessment Reports**

The database developed from facilities condition assessments is the source for a wide variety of reports. Using building and infrastructure assessment results, reports may offer information on the overall condition and functionality of a facility type, such as academic space or student...
housing, or an individual facility and its subsystems. Further sorting of data can identify projects by metrics of condition and functionality, priority, and project cost. Reports can be designed for presentations for different purposes and are limited only by the needs determined as appropriate to an audience.

Summary reports should be more than facts and figures. An executive summary provides an overview and highlights of findings. A narrative describes the assessment process and objectives, priority selection criteria, and list of projects. Assessment summaries can be organized in several ways: by all facilities, by individual facilities, by all building systems, or by individual building subsystems; and by all building components or by individual building components. A suggested list of reports is shown in figure 6.

Figure 6. Facilities Condition Assessments Reports

<table>
<thead>
<tr>
<th>A. All Facilities or Infrastructure</th>
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</thead>
<tbody>
<tr>
<td>Report #1  Summary of all facilities or infrastructure deficiencies</td>
<td></td>
</tr>
<tr>
<td>Report #2  Summaries of all deficiencies by building or infrastructure type</td>
<td></td>
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<tr>
<td>Report #3  Summaries of all deficiencies by building or infrastructure age</td>
<td></td>
</tr>
<tr>
<td>Report #4  Summaries of all facilities or infrastructure deficiencies by systems</td>
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</tr>
<tr>
<td>Report #5  Summaries of all facilities or infrastructure deficiencies by components</td>
<td></td>
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<tr>
<td>Report #6  Summaries of all facilities or infrastructure deficiencies by cost ranges</td>
<td></td>
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<tr>
<td>Report #7  Summaries of all facilities or infrastructure deficiencies by priorities</td>
<td></td>
</tr>
<tr>
<td>Report #8  Summaries of all facilities or infrastructure deficiencies by craft</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Individual Facilities or Infrastructure</th>
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</thead>
<tbody>
<tr>
<td>Report #9  Facility or infrastructure deficiencies</td>
<td></td>
</tr>
<tr>
<td>Report #10  Deficiencies by building or infrastructure type</td>
<td></td>
</tr>
<tr>
<td>Report #11  Deficiencies by building or infrastructure age</td>
<td></td>
</tr>
<tr>
<td>Report #12  Deficiencies by systems</td>
<td></td>
</tr>
<tr>
<td>Report #13  Deficiencies by components</td>
<td></td>
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<tr>
<td>Report #14  Deficiencies by cost ranges</td>
<td></td>
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<tr>
<td>Report #15  Deficiencies by priorities</td>
<td></td>
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<tr>
<td>Report #16  Deficiencies by craft</td>
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</tbody>
</table>

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<tr>
<th>C. Funding Plan</th>
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</thead>
<tbody>
<tr>
<td>Report #17  Capital project priority funding plan</td>
<td></td>
</tr>
<tr>
<td>Report #18  Maintenance operating budget requirements</td>
<td></td>
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</tbody>
</table>
Reporting and Presenting Assessment Findings

The final phase in the facilities condition assessment process is presenting findings and putting the assessment to work.

Communicating with the Audience

The facilities condition assessment is one of the most valuable tools available to help facilities management perform its responsibilities, if the assessment is developed and presented well. Even a flawlessly performed assessment is useless unless the information can be communicated to audiences in a readily understandable format. Careful consideration should be given to the audience, its interests, its knowledge of the subject, and the issues it faces as a decision-making group.

In all cases, the chief facilities officer should provide material that is concise, easily understandable, and attractively presented. The information should be free of jargon, confusing terms, or acronyms that are not self-explanatory. Do not oversimplify for readability, but do design the documents for ease of cross-referencing. Material should be developed in anticipation of the institution's sharpest minds receiving the information. The documentation must be meticulous in detail and accuracy. Simple arithmetic errors and broad generalizations should be avoided by thoroughly checking all financial data, priority selections, and cost-benefit analyses. Expect the unexpected. Be prepared to answer the question: What will happen if we postpone or don't do the work at all?

Developing a Presentation Format

The documentation provided by a facilities condition assessment will have lasting interest because of its impact on campus physical environment and financial matters. Thorough preparation is necessary in the design of materials and presentations to establish and maintain the credibility of facilities management and the reliability of its information.

Before beginning the assessment process, consider the presentation format. The wide array of summaries available from the assessments should focus on priorities and costs, with supporting material keyed to condensed presentations. If the report of physical and functionality findings and conclusions is to be submitted in print form only, without an oral presentation, consider what graphic material would be helpful. The report may be presented as a brief statement of facts with graphics or as an extensive narrative that includes background, description of methodology, findings, and conclusions.

Presentation material should be submitted in advance of an oral presentation to all participants. The following format for assessment review sessions, an example of which is shown in figure 7, should be used to ensure the clarity and conciseness of the presentation:

1. Title sheet
2. Executive summary of the major conclusions and recommendations
3. A map of facilities with building names
4. Facilities age in periods of 5 and 10 years
5. Condition summary of priorities from the facilities assessment building component form
6. Maintenance deficiencies summarized by categories, using cost estimates from facilities assessment inspection forms
7. Maintenance deficiencies summarized by selected subsystems from the facilities assessment inspection forms
8. Project summaries identifying the building or facility and containing a short descriptive title
and project budget; illustration of the funding source, separating operating from capital budgets, can be helpful
9. Detailed project descriptions, presented on individual sheets for each project

Gaining Support for the Facilities Condition Assessment

Once the facilities condition assessment is complete, how do you gain support for a funding program? Essentially, this is done by developing an effective presentation that can gain support for findings and conclusions. Consider the following items when presenting budget requests:

- **Overview.** Does the assessment show a broad understanding of the budget mechanism and present a responsible fiscal position? Do the conclusions and recommendations fit into long-term policies and overall goals?
- **Credibility.** Does the assessment show that previously allocated funds were well used? Does it take the initiative for the best use of new resources for new programs?
- **Competency.** Did the assessment team appear professional and competent during the process and in follow-up activities?
- **Thoroughness of Preparation.** Was the assessment thoroughly researched and analyzed and professionally presented? Was there evidence of collaboration with budget managers and facility users in the preparation of findings and conclusions? The form and content of the presentation must be an accurate presentation of the facts objective, consistent, and capable of withstanding thorough scrutiny.
- **Supportive Senior Administrator.** The budgetary allocation process represents competition for limited financial resources. Without a strong advocate, the facilities condition assessment conclusions may be shelved. A senior administrator who understands the assessment, its findings, and conclusions is an invaluable ally in the funding and implementation process.
- **Preparation for Implementation.** The assessment conclusions must be in an immediately usable format for project planning and implementation. Administrators who will be involved in the implementation process should be included in the formulating of conclusions. Operational staff should be involved when possible. These contributors improve the end result and ensure that the purpose of the assessment is clear to all parties.

Putting the Assessment to Work

Putting the assessment to work means developing an ethic among maintenance staff to continually inspect, observe, and report deficiencies, and maintaining a timely and accurate record of facilities conditions. It also means developing funding alternatives, establishing procedures for program management, and ensuring that the current use of resources is effective and efficient.

The facilities condition assessment process provides the basis for determining capital needs to correct current problems and to avoid future facilities deterioration. This process enables the development of short-term and long-term needs for dealing with problems. Too often, at this point, the process ends in frustrations with senior administrators or the governing board denying or deferring decisions on funding requests.

Many systems and institutions lack three important elements of a capital planning and budgeting process:

- A project prioritization process
• A resource allocation model to formulate funding plans
• A will to change the campus culture in favor of capital asset renewal

Although the number of successful examples is increasing, the evidence from national surveys shows that the rate of facilities deterioration continues to increase. Despite declining public support and financial distress in higher education, the facilities condition problem must be faced sooner rather than later.

Note