

Chapter 2. Basic Database Principles and Applications

This chapter provides an overview of the central concepts and components of an inventory and facilities classification system for postsecondary education facilities. It is intended as an aid to understand how the key components fit together. Additional explanatory detail, technical definitions, and procedures are provided in subsequent chapters and the appendixes.

The central concepts and components outlined in this chapter include

- basic database principles underlying the intended uses of this manual;
- external and internal database applications (reporting and analysis); and
- what to include in a building inventory.

This manual is designed primarily for institutional use. A comprehensive, reliable, and up-to-date facilities inventory is an important tool for the planning and management at a postsecondary institution. Accordingly, the database model described below is designed primarily for use at the institution or campus level.

2.1 Basic Database Principles

Facilities Inventory Systems Contain Data About Buildings and About Spaces Within Buildings. A facilities inventory may incorporate data about many types of structures and physical assets, the most important of which are buildings and spaces. Building information includes such items as gross area, assignable area, and replacement cost. Space information includes such items as space area, space use, and number of stations. Required and optional data elements for both buildings and spaces are defined below and in chapter 5.

Each Building and Space Needs a Unique Identifier. The initial step in a facilities inventory is to assign each building and space a unique code to identify a “record” or set of data fields within the inventory. These identifiers are then used to link spaces to buildings and to link the facilities inventory records to other institutional information such as plant asset records, the registrar’s course schedule, and equipment inventories.

Each Building and Space Record Has Several Fields of Data. Each building or space requires a separate data “field” for each type or element of information. For a given space, its unique space identification (building, floor, and space number), space use category, organizational assignment, and area are required types of data. (See chapter 5 for a full discussion of required and optional data.) Some examples of optional inventory items that may be important to an institution’s space management and utilization study needs are the number of occupants a space can accommodate, architectural features, suitability for specific uses, and the identification of the “disparate use” of a space (e.g., a space designed as a laboratory but used as an office must be recorded as an office). Each of these pieces of information is recorded in a separate field within the space record. Merging of different kinds of information into a single field should be avoided in all cases. For example, marrying the space use “office” with the rank of the occupant, “professor,” to create a space use of “professor’s office” makes analyzing office space of people other than professors difficult. Keeping “office” and “professor” separate enables greater analytic flexibility.

This Manual Provides Basic Coding Structures to Which Institutions Can Add. The required data described in this manual constitute the lowest common denominator, i.e., a set of definitions and codes that is as simple as possible while still covering the range of building and space information essential to any facilities inventory database.

2.2 Database Applications

Facilities Inventory Data Should Be Capable of Uniform Aggregation. Facilities information is important for interinstitutional comparison, for planning and management of the institution or institutional systems, and perhaps for development of national policy. The information gathered in the inventory should be structured to make valid comparisons and summaries possible. (Please refer to chapter 5 for a full discussion of aggregating and reporting facilities inventory data.)

External Applications. From the basic coding structure described above, most inter-institutional comparisons, system reports, and national surveys can be satisfactorily developed by adding additional fields (see section 5.3, Optional Data Elements). Institutions should build from this conceptual framework to enhance the inventory’s usefulness for individual campus management. Appendix A provides guidance in using the FICM for data reporting and interinstitutional data exchange.

Use of Standard Functional Categories. In addition to space use categories and organizational unit assignment, facilities inventory systems commonly contain a set of categories or codes

to allocate space across functional categories (e.g., instruction, research, public service, academic support). The functional categories are used primarily to link space allocations to financial data for indirect cost accounting and to institutional missions (e.g., the proportion of space used for public service) or to analyze and compare space allocations across institutions according to commonly used functional categories.

The functional categories recommended for this purpose are adapted from standard financial reporting categories. Appendix B provides the definitions for these categories as adapted from standard financial reporting guidelines of the National Association of College and University Business Officers (NACUBO) and Office of Management and Budget (OMB) Circular A-21. Coding for function requires identification of the prorated functional use of each space.

Internal Applications. The following are illustrative of internal database applications.

- Institutions may wish to add additional detail to the space use coding structures for internal purposes. For example, a college or university might add subcodes to the space use code 255 of Research/Nonclass Laboratory Service to keep track of cold rooms, hot rooms, dark rooms, laboratory stock rooms, and similar spaces.
- Some institutions may wish to differentiate between classrooms assigned to individual departments and those centrally controlled by the registrar or dean's office by sorting classrooms by their organizational assignment.
- Institutions may wish to identify study rooms or labs with specialized equipment for moderated instruction or study by linking data from a movable or fixed equipment data file to the appropriate spaces in the inventory file.

Some Kinds of Spaces Can Have Many Stations. The concept of "stations" is important for classrooms, laboratories, and other similar space, since it can help determine the number of occupants the space is designed to accommodate. This information is vital for comparing designed capacity to actual use, and in assigning or scheduling the space.

Distinctive Architectural and Other Characteristics Can Be Noted. Optional data elements with specific codes may be used to identify unique architectural characteristics, special utility services, replacement cost, age, condition, suitability, or building ownership. This information is used for a variety of purposes, including scheduling and maintenance planning, financial analysis, and campus planning. These characteristics are also important for understanding cost differences in initial construction, renovations, repairs, and operations.

While this coding can sometimes be determined from up-to-date drawings or the general knowledge of the facilities planning or management staff, these characteristics may be difficult to identify from original designs or original as-built drawings and may require actual inspection of some facilities.

Some Data Elements Are Important for Campus Use But Are of Limited Use in Multi-Institutional Summaries. The list of data elements includes some items that are important for campus use but lose their meaning in interinstitutional, state, or national summaries. For instance, identifiers such as names for particular buildings and spaces are essential for campus use but not in a state summary. Similarly, organizational unit identifiers (e.g., departments) are important on a particular campus but become less meaningful when summarized across institutions because of differences in organizational structures.

2.3 What to Include in a Building Inventory

Definition of Building. A *building* is defined as a roofed structure for permanent or temporary shelter of persons, animals, plants, materials, or equipment. The building inventory may encompass many different types of structures, including marine and space structures (whether staffed or not); research vessels; aquarium structures; and trailers that are not on wheels and are used for offices, residences, or storage (see technical definitions in chapter 3).

Buildings to Be Included. The inventory should include buildings that are under the jurisdiction or control of the institution's governing board, regardless of their location. Where the institution occupies space in buildings not owned by the institution or that is shared with other tenants, include in the inventory only that portion of the building leased or controlled by the institution and its pro rata share of gross area, assignable area, and nonassignable area (see definitions in chapter 3).

Institutions will normally exclude various minor structures from their inventory based on various criteria. As a guideline, separate, minor structures should be included in the inventory if all of the following criteria are met:

- They are attached to a foundation.
- They are roofed.
- They are serviced by a utility, exclusive of lighting.

- They require significant maintenance and repair activities as determined by the institution.

Following these guidelines, an example of a minor structure to be included in a building inventory is a traffic control or information booth that is roofed, attached to a concrete pad, with lights and at least one other utility service such as a telephone, and on a regular maintenance schedule. An example of a separate structure not meeting the above criteria is a bus shelter, which is roofed and attached to the concrete sidewalk, but which has only lights as a utility service.

Institutions may choose to include parking structures and field buildings that do not meet all of the above criteria in their inventories because of requirements to manage and maintain such facilities. The inclusion of such facilities permits the space to be assigned to specific functions, disciplines, and organizational units. Additional clarification and examples are provided in chapter 3.

Buildings to Be Excluded. The following types of buildings may be excluded from the inventory if they do not house functions considered part of the institution's academic mission:

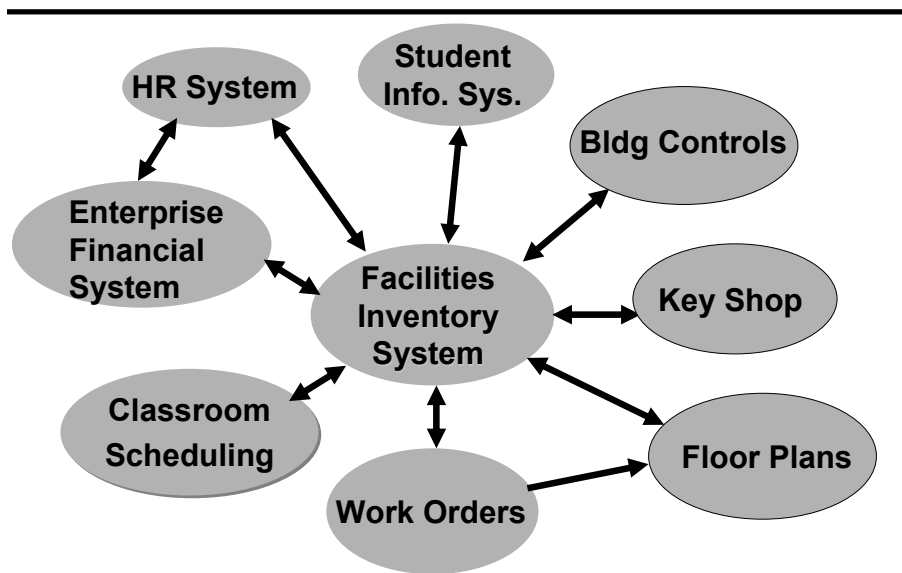
- Investment properties that are buildings used only for revenue generation and not for institutional purposes;
- Hospitals not owned by the institution, except for any space in the hospital used, leased, or controlled by the institution;
- Public schools not owned by the institution but used for practice teaching; and
- Federal contract research centers identified by the Office of Management and Budget.

Other Plant Assets. For management purposes, institutions are encouraged to inventory all other physical infrastructure elements (physical plant assets). Examples of such infrastructure elements (assets) not encompassed in the definition of a building include uncovered swimming pools, athletic tracks, bleachers, and additional playing fields that otherwise do not qualify as gross areas. Institutions are also encouraged to itemize the infrastructure components. Examples include utility distribution systems (heating, cooling, power, water, and waste disposal) and support facilities that provide access or safety-related services (roads, campus lighting, etc.). Additionally, institutions may wish to maintain inventory data on land holdings, capital equipment, and movable equipment. A suggested approach for tracking infrastructure assets is presented in chapter 6.

2.4 Links to Other Systems

Neither program nor facilities decisions are made in isolation. Facilities data are almost always used in conjunction with financial, academic, human resource, and program data. As a result, linking facilities data to other databases is increasingly prevalent. The diagram below illustrates some of the more common systems to which facilities databases commonly link.

Figure 2-1. Example of facilities inventory data links with other systems



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