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AUTOMATED OPERATIONS, MAINTENANCE
AND FACILITY MANAGEMENT

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Our final segment today deals with building operations and maintenance and facility management. This is easily the largest segment of the building process. The area is large both in terms of the time span it covers and in the number of diverse functions which are included in these activities. (Slide 1.) This afternoon I would like to (1) define what we mean when we say facility management since it has many meanings; (2) describe, in management terms, the information resource needs of the facility manager, and (3) discuss some of the current developments in the area and what still needs to be done.

WHAT IS FACILITY MANAGEMENT?

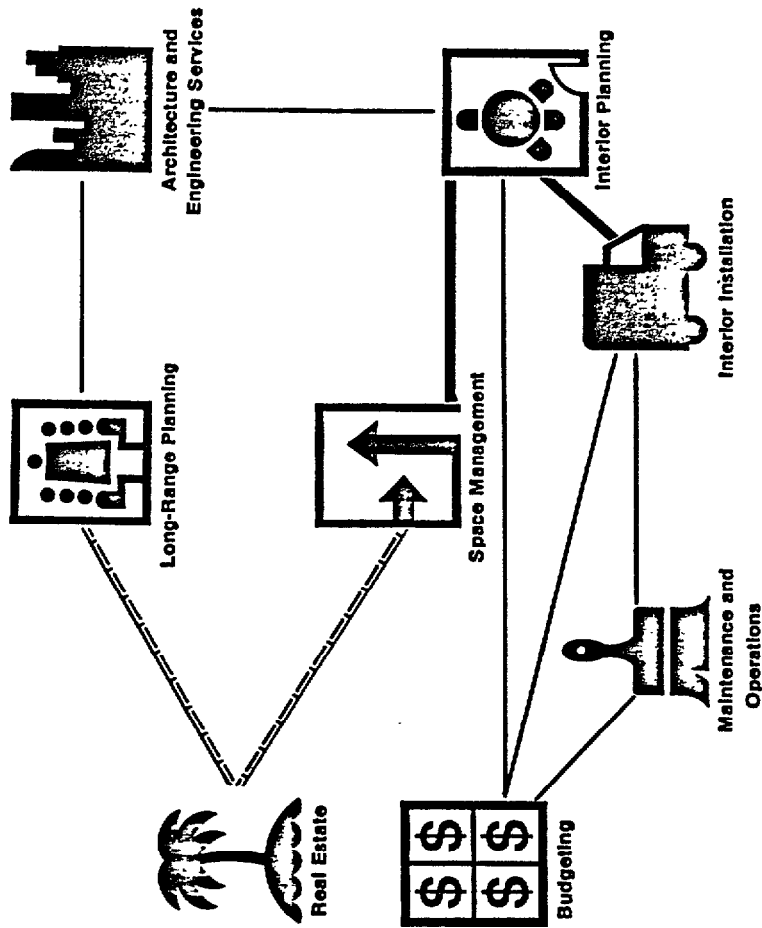
While the term facility management has been around for many years, it still means different things to different people, and organizations are often structured quite differently to carry out facility management responsibilities. (Slide 2.) Facility management covers a wide range of diverse activities and tasks (Slide 3) and involves many different skills and various diverse disciplines, each of which have traditionally viewed facility management from their own, often limited, perspective.

The term "facility" means more than just the space in which we work. Facilities are all of the productive resources we have in

AUTOMATED OPERATIONS, MAINTENANCE
AND FACILITIES MANAGEMENT

- o WHAT IS FACILITY MANAGEMENT?
- o WHAT ARE THE DATA REQUIREMENTS?
- o CURRENT DEVELOPMENTS
- o WHAT NEEDS TO BE DONE?

How Facility Management Responsibilities Are Organized



Symbols denote responsibilities performed by the same unit in 85% of the organizations surveyed.

— performed by the same unit in about 70% of the organizations surveyed.

- - - performed by the same unit in about 60% of the organizations surveyed.

— performed by the same unit in about 50% of the organizations surveyed.

SOURCE: The IFMA Report #2, 1986

FACILITY MANAGEMENT TASKS

ARCHITECTURAL DESIGN	FURNITURE SPECIFICATION
BREAKDOWN MAINTENANCE	HAZARDOUS WASTE DISPOSAL
BUILDING ACQUISITION-LEASE	HOUSEKEEPING
BUILDING ACQUISITION-PURCHASE	INTERIOR/SPACE PLANNING
BUILDING PROGRAMMING	LANDSCAPE MAINTENANCE
CAPITAL BUDGETING	LANDSCAPING
CODE COMPLIANCE	LONG-RANGE PLANNING
CONSTRUCTION	MAINTENANCE OF FINISHES
CONSTRUCTION MANAGEMENT	MAJOR INTERIOR CHANGES
CONTRACT ADMINISTRATION	MINOR INTERIOR CHANGES
CONTRACTING	OPERATING BUDGETS
DESIGN EVALUATION	OUTLEASING
ENERGY MANAGEMENT	PREVENTIVE MAINTENANCE
ENGINEERING SERVICES	PROPERTY APPRAISAL
EXTERIOR MAINTENANCE	PROPERTY DISPOSAL
FURNITURE BUDGETS	QUALITY CONTROL
FURNITURE DISPOSALS	REPLANNING
FURNITURE INSTALLATION	SITE ACQUISITION
FURNITURE INVENTORY	SITE SELECTION
FURNITURE MAINTENANCE	TENANT SATISFACTION EVALUATION
FURNITURE MOVING	TRASH REMOVAL
FURNITURE PURCHASING	

our work environment which enable us to carry out our responsibilities. They include the office, factory, warehouse, and even open space within which we work, plus the furniture, fixtures, equipment, tools, and environmental support systems we need within those spaces to perform our functions or missions.

In defining facility management, the emphasis must be placed on the word "management." Management entails abilities in planning, directing, organizing, projecting, justifying, observing, and operating. Applying these management skills to facilities creates the field of facility management.

Facility management is often viewed too narrowly. For example, top management often sees it as a procurement function. This is because the facility manager procures the services needed to keep a facility running. Such a narrow view tends to stifle effective management because it ignores the other essential functions performed by the facility management team. A good example of this is the decision to put PC's into the workplace. Generally the facility manager becomes involved after the computers have arrived. At this point, none of the preparatory planning has been done, work areas have not been prepared to receive the new equipment, and as a result, the PC's often end up being underutilized. Procurement is just one of the many functional activities in the matrix of activities which collectively constitute facility management.

In the traditional views of facility management, the three elements of an organization--the process, the people, and the place--are not interlinked. The normal view focuses on the process--the mission, what must be done and how. (Slide 4.) The people who carry out the mission receive some attention and the workplace, the facility, receives hardly any attention at all in managing the total organization.

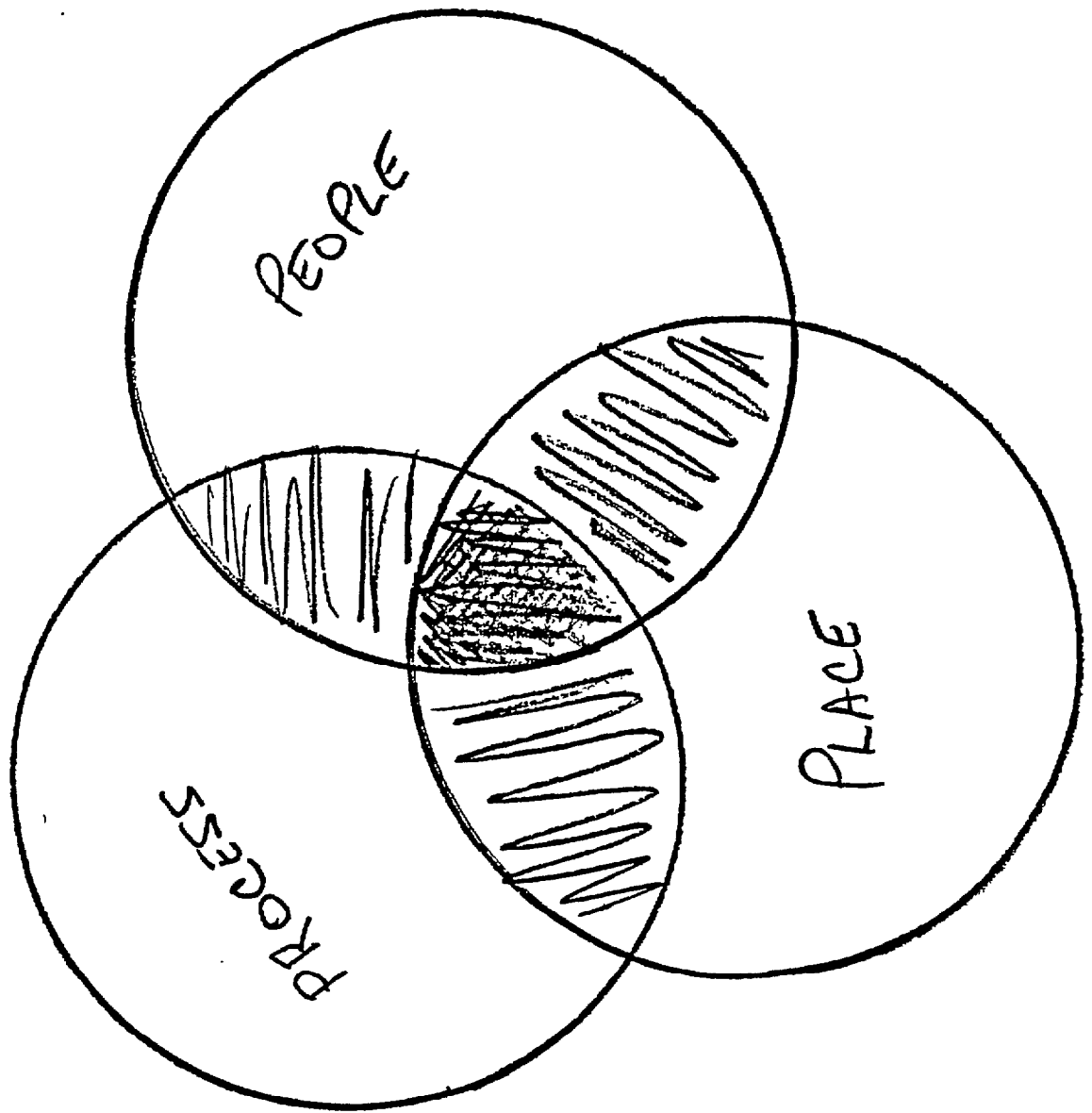
Personally, I prefer the holistic view of facility management. In this view, the three elements are interlinked. (Slide 5.) It should be noted that only two individuals, in the execution of their jobs, have a real interest in the small area where the three elements overlap. These are the head of the agency or company, and the facility manager. The top management official makes decisions which effect all three elements, and the facility manager must make the workplace responsive to the mission and the needs of the people.

There are basically three levels of facility management. At the most basic level, facilities are viewed simply as costs, and therefore, most of management's attention is focused on cost containment and reduction, and not on managing the facilities for maximum benefit. Actions are normally reactive rather than proactive. This is the level where most organizations, public and private, operate today.

PROCESS

PLACE

DEVELOP



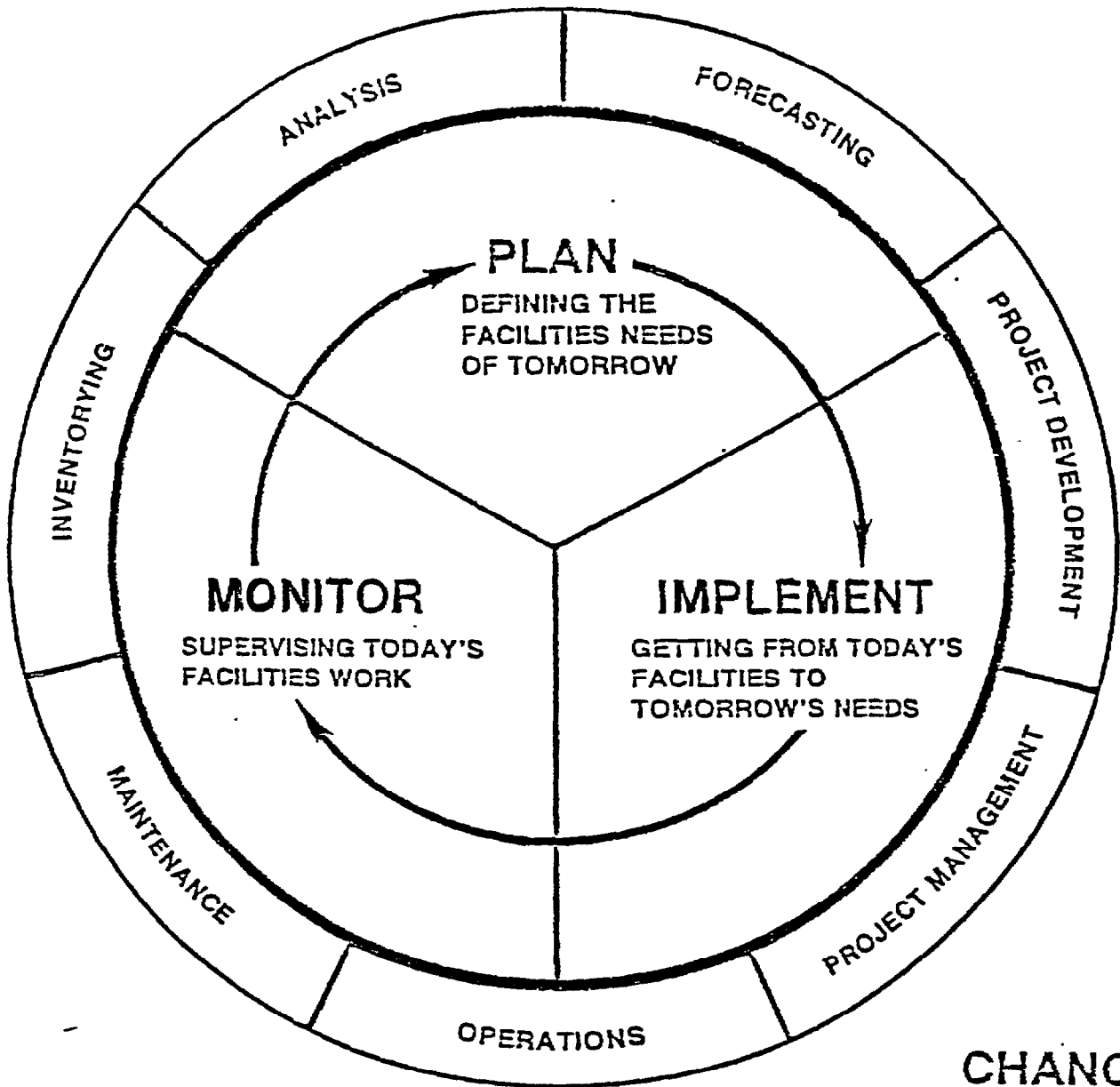
At the second level, facilities begin to be viewed as an asset to be managed. Preserving and enhancing the value of these assets becomes the priority. There is movement in this direction as more and more organizations realize that their facilities represent more than just costs which must be contained or reduced.

Finally, at the most sophisticated level, facilities are seen, used, and managed as tools of the organization. Emphasis is placed on how they facilitate or impede the programs and work processes of the organization. The Woods Hole Workshops have, perhaps unknowingly, focused on this sophisticated level of facility management. An integrated building process data base is essential for facility managers operating at this level.

Facility management functions are spread across a space-time continuum, in three broad categories. (Slide 6.) At the starting point are activities relating to defining the facilities needs--the policy development, planning, forecasting, etc. At the other end are the status activities--supervising today's facilities work, operating, maintaining. In between is change management--getting from today's facilities to tomorrow's needs; procurement, space planning, design services, construction, etc.

Change management is a very important element in facilities management. In today's environment, the introduction of new technology in the workplace is changing the way we operate. GSA

FUTURE



PRESENT

CHANGE MANAGEMENT

has announced a new initiative called A New Agenda for a Quality Workplace. This initiative is the result of a top level policy decision, but it will be the decisions of the facility managers that will most likely determine whether the initiative is a success or a failure. If the program is not properly implemented, the result will most likely be a decrease in productivity rather than the expected increases.

To effectively manage change, facility managers must effectively integrate the people (tasks), technology (systems), information (various media), and the facilities (space). (Slide 7.) To do this, they need better information; they need systems which can pull together complete and accurate information in a usable form. This is the goal of an integrated building process data base.

WHAT ARE THE DATA REQUIREMENTS?

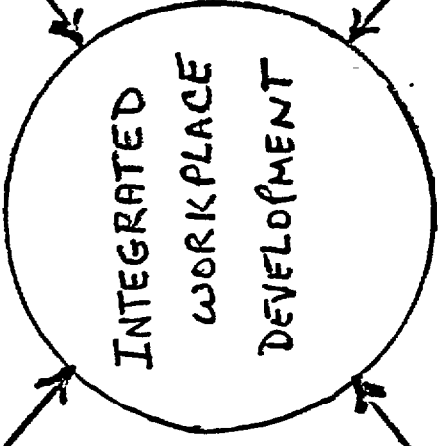
You have seen the demonstration of the integrated data base concept and have heard from speakers addressing the earlier phases of the building process. (Slide 8.) Now, let's look at the data base from the perspective of the facility manager, who is responsible for coordinating the physical workplace with the people and work of the organization. What information does the facility manager need to do their job more effectively, efficiently, and economically?

INFORMATION

MEDIA

TECHNOLOGY

SYSTEMS



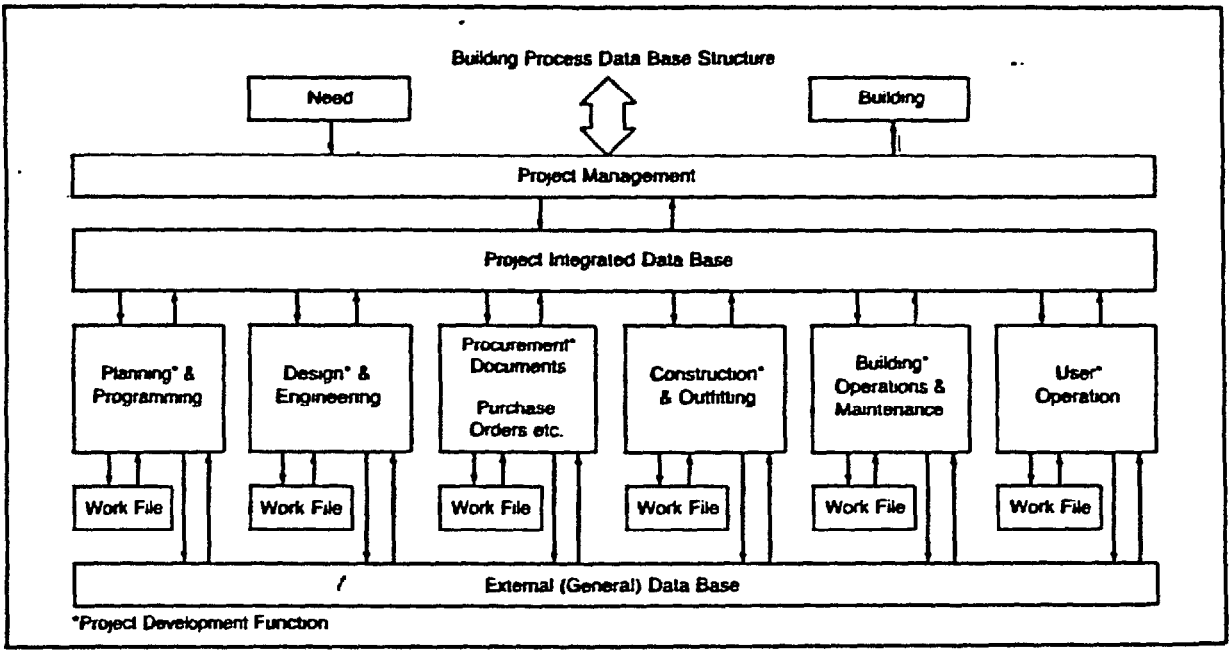
INTEGRATED
WORKPLACE
DEVELOPMENT

PEOPLE

TASKS

SPACE

FACILITIES



From the facility management perspective, the data base envisioned is really a comprehensive management accounting system, which would provide facility managers and top management with essential information needed to (1) manage the facility assets of the organization; (2) evaluate facility performance and cost effectiveness; (3) assure that the mission needs of the organization are met through effective, efficient, and economic use of facilities; and (4) make adjustments in existing and future facilities to improve their performance and responsiveness. (Slide 9.)

I want to make it perfectly clear that I am not talking about a financial accounting system, although there must be an interface between the financial accounting system and the facility management accounting system. A financial accounting system's primary role is to provide financial data to meet the needs of outsiders--in the private sector that would be the IRS, the SEC, and the stockholders; in government it would be the Congress, OMB, the Treasury, the head of the agency, and often the auditors. A management accounting system, on the other hand, should be tailored to meet the needs of management and must include both financial and non-financial data. (Slides 10 and 11.) The basic question in management accounting is the pragmatic one: "Is the information useful?", rather than, "Does it conform to generally accepted principles?"

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COMPREHENSIVE MANAGEMENT ACCOUNTING SYSTEM

- **MANAGE FACILITY ASSETS**
- **EVALUATE FACILITY PERFORMANCE AND COST EFFECTIVENESS**
- **MISSION NEEDS MET THROUGH EFFECTIVE, EFFICIENT, AND ECONOMIC USE OF FACILITIES**
- **ADJUSTMENTS IN EXISTING AND FUTURE FACILITIES TO IMPROVE PERFORMANCE AND RESPONSIVENESS**

- o AS CONTRASTED WITH FINANCIAL ACCOUNTING,
MANAGEMENT ACCOUNTING:

- o SEVERAL SETS OF PRINCIPLES RATHER THAN ONE
- o NOT NECESSARILY GOVERNED BY GENERALLY
ACCEPTED PRINCIPLES
- o INCLUDES MORE NONMONETARY INFORMATION
- o MORE EMPHASIS ON THE FUTURE
- o OPTIONAL RATHER THAN MANDATORY
- o FOCUS ON SEGMENTS RATHER THAN THE WHOLE
- o LESS EMPHASIS ON PRECISION
- o A MEANS TO AN END RATHER THAN AN END IN ITSELF

- o NO SINGLE, UNIFIED MANAGEMENT ACCOUNTING SYSTEM

- o THREE TYPES OF INFORMATION, EACH USED FOR DIFFERENT PURPOSES, CONSTITUTE MANAGEMENT ACCOUNTING:
 - o FULL COST ACCOUNTING
 - o DIFFERENTIAL ACCOUNTING
 - o RESPONSIBILITY ACCOUNTING

- o OBJECTIVE IS TO PROVIDE USEFUL INFORMATION FOR:
 - o PLANNING AND COORDINATING FUTURE WORK
 - o DIRECTING DAY-TO-DAY OPERATIONS
 - o CONTROLLING ACTIVITIES--EVALUATING RESULTS AND TAKING APPROPRIATE ACTIONS

Such a system has both descriptive and prescriptive data requirements. (Slide 12.) On the descriptive side is the facility information data base. There are six categories of data needed. The first four categories--space attributes, space use and assignment, property control, and facility facts--are alphanumeric data items and represent about 80 percent of the data requirements. The other two categories--building graphics and exterior graphics--represent only 20 percent of the requirements. These six categories of data represent all the information required about a facility to perform any and all of the tasks which must be accomplished in managing facilities.

On the prescriptive side, the resource management needs are listed. On this side the facility manager can specify what information will be needed to manage the facilities of the agency or company. Some typical categories of information which might be required are

- Service calls, work orders, alteration project authorizations;
- Preventive (planned) maintenance;
- Inventory and spare parts;
- Budget and accounting; and
- Time and attendance;

Also on this side would be information for report generation, forecasting, space planning, and others--there is no limit.

MANAGEMENT ACCOUNTING DATA REQUIREMENTS

DESCRIPTIVE INFORMATION DATABASE	PRESCRIPTIVE RESOURCE MANAGEMENT
1. SPACE ATTRIBUTES	1. SERVICE CALLS, WORK ORDERS, ALTERATION PROJECT AUTHORIZATIONS
2. SPACE USE AND ASSIGNMENT	
3. PROPERTY CONTROL	2. PREVENTIVE (PLANNED) MAINTENANCE
A. INSTALLED EQUIPMENT	3. INVENTORY & SPARE PARTS
B. UNIT SUPPORT-- TELEPHONE, PRINTING	4. BUDGET & ACCOUNTING
C. PERSONAL PROPERTY-- TYPEWRITERS, PC'S	5. TIME & ATTENDANCE
D. FURNITURE & FIXTURES	6. REPORT GENERATION
4. FACILITY FACTS	7. FORECASTING
A. LAND	8. SPACE PLANNING
B. LAND IMPROVEMENTS	ANY NUMBER OF OTHERS PRESCRIBED BY THE FACILITY MANAGER
C. BUILDINGS/STRUCTURES	
D. ROOMS/SPACES	
E. WORK SPACES	
F. EQUIPMENT	
5. BUILDING GRAPHICS	
6. EXTERIOR GRAPHICS	

It is interesting to note that although graphics constitute only a small portion of the requirement, much of the development has focused on the graphics tools. Some developers have realized that graphics is not the highest priority on the facility manager's needs list. Other areas, such as service calls, work orders, planned maintenance, and inventories all have higher priorities, as does the integration of some of these systems.

That briefly summarizes the data needs of the facility manager, now what is going on to address these needs.

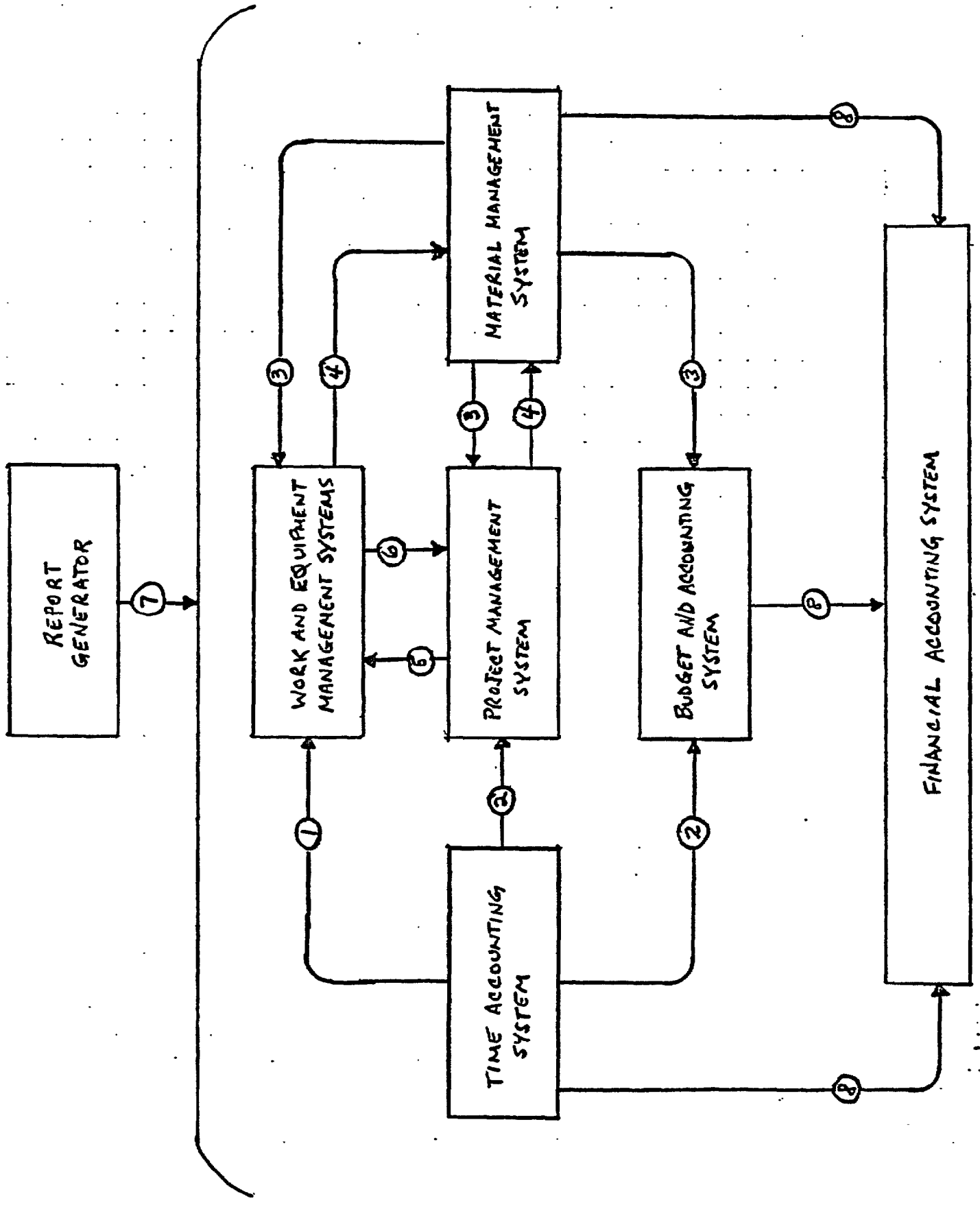
WHAT IS HAPPENING IN THE FACILITY MANAGEMENT ARENA?

The explosive growth of computer aids in the field is making it difficult for facility managers to keep abreast of all the new technological and product developments. In the past few years, great strides have been made in developing computer-aided tools to assist the facility manager. Computer-aided drafting systems are being used in master planning, space planning, and space management; automated inventory systems have been introduced using bar-code technology; and voice-activated data entry systems are being developed for building inspectors to use. While some integration of facility management tasks is beginning to occur, most programs are basically stand-alone, with very little integration.

The September 1986 issue of Facilities Design & Management includes a computer-aided facility management software source guide. The guide is based on application-specific functions. While the guide does not include the full universe of vendors offering computer-aided facility management software, the list is impressive. The software listed includes programs which will run on mainframes, minis, and micros, although the majority are mini- and micro-based.

The development of computer applications in the operations and maintenance area seems to be following the same route as computer developments in other areas of the building process. Time consuming and tedious functions are being automated without too much thought on whether the computer can allow the process or procedures to be changed to improve efficiency. There are a few systems available which are capable to pulling information together from various subsystems or other data bases in order to provide the facility manager with a broader, more complete picture. (Slide 13.)

One fairly recent occurrence which you should be aware of is an agreement between six of the CADD vendors. A couple of months ago, I don't know the exact date, CADAM, CalComp, Calma, Computer-Aided Planning, McDonnell Douglas, and Auto-Trol agreed on a common computer interface to link their hardware systems with a facility management software package. Both the technical standard and the facilities software were written by the



Notes for Slide 14:

- (1) calculates and transfers labor hours and costs.
- (2) Calculates and transfers labor costs.
- (3) Calculates and transfers material costs.
- (4) Creates material/parts order and posts to material/parts record.
- (5) Creates work orders in planning file.
- (6) Updates work status.
- (7) Accesses appropriate databases and retrieves required data.
- (8) Allows user definition of interfaces.

Computer-Aided Design Group, which is making the interface available to competitors free of charge. This endorsement of the CADG interface standard will probably create a defacto industry standard for facility management information exchange.

WHAT NEEDS TO BE DONE?

Many things obviously remain undone. The integration of programs and data bases is essential. The interface problem remains as a key issue. Whether the interface standard developed by CADG can standup remains to be seen. Also, the facility information needs and data requirements of the facility manager and top management need to be more clearly defined. Operations and maintenance can produce a lot of data, but decisions must be made as to what data is essential. In other words, that pragmatic management accounting question--Is it useful?--still must be answered. This is definitely an area where less can mean more.

Those of you who read Facilities Design & Management know that a special focus was placed on computer-aided facilities management in the September 1986 issue. In the editorial for that issue, Anne Falluchi, the editor, summed up the current state of affairs. She said that while facility management executives have recognized that many of the facility management procedures and process which cannot be handled manually can be computerized and expedited with electronic speed, a larger issue still remains to be addressed. That is, using computers to access databases on a

query or reporting basis to get bottom-line management information. The problem as she sees it is that the corporate world, and I would add federal agencies, has not yet defined what comprises the bottom-line, let alone how to integrate the various cost results of many activities to arrive at significant summary unit-cost and total-cost data about operations. She concluded that it is not surprising that none of the software vendors polled by the magazine listed bottom-line management information as an application for their product. I think this editorial pretty much sums up what needs to be done. This is an area where I believe there will be progress made in 1987.