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TECHNICAL HANDBOOK FOR  
ENVIRONMENTAL HEALTH AND ENGINEERING  
VOLUME VI - FACILITIES ENGINEERING  
**PART 73 - FACILITIES ENGINEERING DATA SYSTEM**

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**CHAPTER 73-1 INTRODUCTION**

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**73-1.1 BACKGROUND**

- A. Maintenance funding has, historically, been inadequately funded. Funding levels have remained level or increased minimally, while building space eligible for funds (\$/m<sup>2</sup>) has decreased. Inadequate funding has resulted in reduced and/or delayed maintenance of real property, causing deterioration of property value and increased need and cost of future repairs. The reporting mechanism to accurately track the categories of maintenance and improvement needs of real property is the Facilities Engineering Data System (FEDS). The FEDS is a table found in the Facilities Program Data System (FPDS). The FEDS identifies and catalogues maintenance and improvement needs. The FEDS table groups items into categories along with a description of the item, required corrective action, estimated cost and other relevant data. The purpose is to provide facilities managers with a concise list of specific items and methods to restore, repair, maintain, and improve the real property. The physical plant and functional adequacy of each installation can therefore be more effectively managed by systematically taking corrective actions and meeting required or proposed program improvements.
- B. FEDS data are divided into categories to define the corrective action into specific groups. Each category is assigned a code for identification in the FEDS database.

**73-1.2 PURPOSE**

The purpose of the FEDS table is to manage information on the current conditions at a facility and to catalogue the routine activities necessary for daily operation of a facilities engineering program.

The FEDS therefore allows a facilities manager to:

- A. Compare an installation's condition and functional performance to other IHS installations;
- B. Define capital repair and replacement projects in order to eliminate the BEMAR;
- C. Develop cost estimates for planning projects;
- D. Restore functionally obsolete installations to a usable condition;

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- E. Eliminate conditions that are either potentially damaging to the property or present life safety hazards;
- F. Identify energy conservation measures required to meet Public Law requirements;
- G. Analyze each facility for physical condition, economic life expectancy, corrective action, project completion time span, and estimated cost of correction;
- H. Determine facilities assets and redistribution of existing resources;
- I. Prepare a program plan that provides justification for changes in location, consolidation, and priorities, or provide new solutions;
- J. Better project unmet needs;
- K. Identify possibilities of additional resources; and
- L. Better forecast the facilities budget.
- M. Generate the annual FEPP document.

### **73-1.3 SCOPE**

Identified items typically are:

- A. Premature systems deterioration from lack of maintenance to:
  - (1) Exterior and interior finishes such as paint, flooring, and roof systems
  - (2) Electrical and mechanical equipment such as ventilation and exhaust fan bearings, electrical windings, and plumbing.
- B. Degradation of environmental quality due to lack of:
  - (1) Filters or improperly-sized replacement filters in air distribution systems;
  - (2) Site monitoring of underground fuel storage tanks; and
  - (3) Backflow preventers to protect public and domestic water systems, vacuum breakers on hose bibs, lab sinks, film processors, and similar equipment.
- C. Change in program requirements resulting from:

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- (1) Lack of adequate isolation rooms;
  - (2) Change in use of space function; and
  - (3) Lack of space for storage, proper maintenance access, or new electronic equipment.
- D. Compliance with Public Law requirements regarding;
- (1) Handicap accessibility,
  - (2) Environmental, and
  - (3) Energy conservation.
- E. Design/construction oversights resulting in a lack of:
- (1) Outside air intakes for medical/dental compressors or heating equipment combustion air; and
  - (2) Space to access equipment for maintenance.
- F. Energy inefficiencies such as:
- (1) Inadequate cooling of electrical and mechanical equipment,
  - (2) No temperature setback mechanisms, and
  - (3) Poorly operating ventilation systems.

#### **73-1.4 IMPLEMENTATION**

- A. Entries to the FEDS database are generated from different activities, ranging from periodic walk-through inspections of facilities staff to deep look surveys of facilities. This database is then used by facilities managers to generate projects for the repair and improvement of facilities. These projects are reported in the Facilities Engineering Report (FER) for the facility and service unit. Each Area prepares a consolidated FER from individual FER's. See Part 71 of this handbook for a description of the FER.
- B. The database is used by Area and Headquarters to determine priorities and aggregate cost of corrective actions versus replacement of any particular installation. Corrective actions and their cost estimates assist program managers and facilities managers in making determinations about their installation(s).

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**73-1.5 BENEFITS**

A. The following benefits result from the FEDS program:

- (1) Facilities accreditation requirements are met,
- (2) Building systems are effectively evaluated and corrective actions lead to replacement and/or assist in more effective maintenance and operation,
- (3) Life expectancy of building systems is prolonged,
- (4) Work environment is improved,
- (5) Ultimately customers are better satisfied with services provided at the facility, and
- (6) Compliance with Public Law is achieved.

B. Changing technology results in the need for installation of new sophisticated medical and non-medical personal property equipment in our facilities. If real property mechanical and electrical systems are not upgraded to meet the requirements of the new personal property equipment, serious deficiencies could lead to ineffective utilization of the new equipment. Also, the original design of the facility and changes in program requirements over the course of time frequently do not allow for increase in space. As a result the existing facility is burdened with ineffective flow of operations.

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**CHAPTER 73-2 DEFINITIONS**

**DEEP LOOK** - An in-depth evaluation of the physical condition and functional performance of the real property (i.e., structure, appurtenances), building service equipment, utilities, grounds, and program space utilization conducted every five years by a professional team. Identified items are limited to those estimated to cost over \$1,000 to accomplish. Items costing less than \$1,000 will not be entered into the FEDS database but will be maintained at the service unit level for local accomplishment through local projects.

**INSPECTION** - The critical examination of a system, components of a system or individual equipment items to determine their conformance to applicable quality standards or specifications of operation (e.g., elevator, boiler, cooling tower).

**MAINTENANCE** - Maintenance is work to keep a facility in a usable state or condition and in operation for its intended purpose. It includes construction performed to improve or increase the operation of the facility, or enhance the aesthetics.

**INSTALLATION (FACILITY)** - Separately located and defined real property that stands alone as an entity, a building or group of buildings, a structure and utility systems and/or the associated site (e.g. health center, clinic, hospital, quarters, or health center and quarters, hospital and quarters). Each defined facility or acreage is uniquely identified with a real property inventory number that identifies it from all other government installations. An installation consists of the land (acreage), together with improvements (utilities), structures (pump houses), and fixtures (fence, lighting posts) located thereon (including pre-fabricated movable structures, such as pre-fabricated (Butler) buildings, Quonset huts, and trailers (with or without undercarriages), and appurtenances thereto, excluding moveable machinery and equipment.

**BUILDING SERVICE EQUIPMENT** - This is equipment which is permanently installed in or attached to buildings or structures for the sole purpose of rendering such building or structure usable or habitable. The removal of such equipment would generally require major or significant repairs or improvements to place the area in which it was located in a usable condition. Examples of building service equipment include the heating and cooling system (boilers, air handlers, control air compressors, piping, etc.), elevators, plumbing system (piping, sinks, toilets, etc.), and electrical system (lighting fixtures, electrical panels, receptacles, etc.). This definition is sometimes erroneously referred to as real property installed equipment (RPIE).

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**ANNUAL GENERAL INSPECTION (AGI)** - Surveys accomplished by each IHS Area office annually for the purpose of:

- (1) Reviewing the status of FEDS entries in the latest database printout,
- (2) Providing consultive services for new additional recommendations,
- (3) Reviewing problem areas or re-estimating corrective actions,
- (4) Assessing any additional building that have been acquired since the last deep look, and
- (5) Re-assessing buildings for recently developed problems.

**FACILITY** - See definition for installation above.

**BACKLOG OF ESSENTIAL MAINTENANCE AND REPAIR (BEMAR)** - This is a category of maintenance and repair type corrective actions that are needed now and may have been repeatedly deferred because of a lack of staffing or funds to implement corrective measures. This category includes all buildings associated with an installation to include personnel quarters. The category excludes items resulting from lack of program space, proposed improvements to enhance the efficient operation of the facility, and requirements mandated by Public Laws.

**COST ESTIMATE (BUDGET ESTIMATE)** - In general, the budget estimate consists of the sum of the material costs, labor, contractor's profit and overhead. Regional and national publications, such as Means Construction Cost Data, or Consumer Price Index (CPI), usually serve as a basis for adjusting (escalating) the cost of these components. In addition, contracting and design fees, inspection fees, and overhead costs may be added based on the method of accomplishment that is projected and other miscellaneous and local conditions. Estimates are to be used for budgeting purposes only and not necessarily the same as the independent government cost estimate.

**CORRECTIVE ITEMS** - An existing item that is in poor physical condition, or does not exist, or does not comply with current minimum acceptable mandatory standards. These include items that must be corrected to meet public law, regulatory provisions, and recognized engineering and management standards. Items are grouped by category in the FEDS database.

**FACILITIES WORK ESTIMATION AND APPROVAL FORM (HSA-430)** - This form is utilized to document entries and provide narratives and recommended actions. The reverse side is used for estimating the cost of accomplishing the task.

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**FEDS CODES** - Numbers assigned to categorize items into workable groups in the FEDS database.

The following codes are utilized:

- 01 **PATIENT CARE** - Items required for the patient's social environment such as inadequacy of; space to support services, closet and drawer space for storing personal property, lack of an environment that fosters a positive self image, lack of privacy to reflect sensitivity to patients' age, developmental levels, and clinical needs, lack of activities to support the development and maintenance of the patient's interests, lack of telephones for patient private conversations, lack of furnishings and equipment suitable to the population served appropriate to the length of stay for therapeutic reasons.
- 02 **LIFE SAFETY COMPLIANCE** - Fire protection requirements of the structure which result in a lack of full compliance with the Life Safety Code, NFPA 101. For example; inadequate fire barriers, smoke barriers, means of egress, door ratings, and fire protection equipment requirements.
- 03 **GENERAL SAFETY** - Corrective actions generated from the lack of compliance with established health care industry safety practices, e.g., employee ventilation hoods, tripping hazards, etc.
- 04 **ENVIRONMENTAL COMPLIANCE** - Items required to comply with Federal, State or Local environmental laws and regulations. For example; underground storage tank, boiler and incinerator emissions, sewage effluent, asbestos, radon, disposal of hazardous wastes, and industrial hygiene.
- 05 **PROGRAM CORRECTIVE ITEMS** - Modifications or enhancements to existing workflow patterns through improvements to the structure to increase the efficiency of the delivery of health care. This is accomplished through; expansion of program functions within existing space through re-alignment of existing functions, erection of additional space to compensate for displaced existing functions and/or erection of additional space to directly expand programs, and modifications required as a direct result of installation of additional or replacement personal property equipment., e.g., increase electrical service for new x-ray suite, increased ventilation for program (tuberculosis suites, other equipment).
- 06 **UNMET SPACE NEEDS** - Items required due to program modifications or enhancements requiring additional supportable space (as per current IHS Health facilities Planning Manual (HFPM) guidelines) to compensate for displaced existing functions and/or erection of additional space to directly expand programs, and modifications

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- required as a direct result of installation of additional personal property equipment, e.g., additional dental space, specialty clinics, warehouses, program support space, etc.
- 07 **HANDICAPPED COMPLIANCE** - Items resulting from non-compliance with the American with Disabilities Act (ADA). For example; handicapped accessibility in the parking area, building entrances, toilets, drinking fountains, elevators, telephones, fire alarm, and others.
- 08 **ENERGY MANAGEMENT** - Items resulting from energy conservation opportunities (improvements) to the structure or building service equipment systems that has a life cycle cost effectiveness and a payback of less than ten years.
- 11 **BEMAR STRUCTURAL** - Structural items that if not addressed will result in the failure of the building structure, e.g., seismic inadequacies, foundation settlement, overload of structural members.
- 12 **BEMAR MECHANICAL** - Real property mechanical systems or individual components of the systems and interior building utilities associated with the systems that should be replaced on a recurring basis due to normal wear and tear to maintain the real property in good operating condition that if not addressed will result in failure of the systems. For example; HVAC central/packaged units, pneumatic controls, exhaust fans, chillers, cooling towers, plumbing, fuel, potable water, fire alarm, lift stations, fire sprinklers, and automatic extinguishing hoods.
- 13 **BEMAR ELECTRICAL** - Real property electrical normal or emergency power systems or components of the systems and interior building utilities associated with the systems that should be replaced on a recurring basis due to normal wear and tear to maintain the real property in good operating condition that if not addressed will result in failure of the systems. For example; transformers, emergency generators, switchgear, wiring, main breakers, and others.
- 14 **BEMAR UTILITIES** - Incoming services to the facility that are required for the building to be fully operational, e.g., water, sewage, electric, natural gas, wells, water tanks, propane storage systems, etc.
- 15 **BEMAR GROUNDS** - Real property grounds components that should be replaced on a recurring basis due to normal wear and tear to maintain the grounds in good condition that if not addressed will result in adverse impact to the land. For example; trees, sod, erosion, lawn sprinklers, parking, bridges, cattle crossings, fences, and roadways.

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- 16    **BEMAR ARCHITECTURAL** - Changes to the finish surfaces, interior or exterior, e.g., floor coverings, wall coverings, ceilings, etc.
- 20    **PLANT MANAGEMENT** - Operational and facilities management tasks required for daily routine activities, e.g., service contracts, staffing, training, etc.
- 21    **PROJECTED STRUCTURAL NEEDS** - Structural items that should be replaced or repaired in future fiscal years (one through five), i.e., five year plan of correction to structural items. A repair or replacement scheduled for five years in the future can be moved to "year one" if the need has significantly increased. Current year repairs or replacement of structural items should be included in code 11.
- 22    **PROJECTED MECHANICAL NEEDS** - Replacement or repairs to real property mechanical systems or individual components of the systems that can be scheduled in future fiscal years (one through five), i.e., five year plan of correction to mechanical systems or components. A repair or replacement scheduled for five years in the future can be moved to "year one" if the need has significantly increased. Current year repairs or replacement of mechanical systems or components should be included in code 12.
- 23    **PROJECTED ELECTRICAL NEEDS** - Replacement or repairs to real property electrical systems or individual components of the systems that can be scheduled in future fiscal years (one through five), i.e., five year plan of correction to electrical systems or components. A repair or replacement scheduled for five years in the future can be moved to "year one" if the need has significantly increased. Current year repairs or replacement of electrical systems or components should be included in code 13.
- 24    **PROJECTED UTILITIES NEEDS** - Replacement or repairs to real property exterior utility systems or individual components of the systems that can be scheduled in future fiscal years (one through five), i.e., five year plan of correction to utility systems or components. A repair or replacement scheduled for five years in the future can be moved to "year one" if the need has significantly increased. Current year repairs or replacement of utility systems or components should be included in code 14.
- 25    **PROJECTED GROUNDS NEEDS** - Replacement or repairs to the grounds that should be replaced on a recurring basis due to normal wear and tear to maintain the grounds in good condition that can be scheduled in future fiscal years (one through five), i.e., five year plan of correction to grounds. A repair or replacement scheduled for five years in the future can be moved to "year one" if the need has significantly increased. Current year repairs or replacement of grounds should be included in code 15.

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- 26 **PROJECTED ARCHITECTURAL NEEDS** - Replacement or repairs to real property architectural components that can be scheduled in future fiscal years (one through five), i.e., five year plan of correction to architectural. A repair or replacement scheduled for five years in the future can be moved to "year one" if the need has significantly increased. Current year repairs or replacement of architectural components should be included in code 16.
- 99 **OTHER** - Replacement or repairs to other real property components not falling into any of the categories 2- through 26 that can be scheduled in future fiscal years.