

## CHAPTER 6

### FUNCTIONAL COMPONENTS AND STANDARDS OF CONSTRUCTION

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#### 6—1. Definition

A functional components system consists of pre-engineered design, bills of materials, and related materials cost and logistic data that are designed to support military operations. Some of the components are completely prefabricated and relocatable; others must be constructed from standard construction building materials. All items of a component have been identified by Federal stock numbers, drawings, specifications or manufacturer, make, and model numbers to expedite the procurement process. In some instances, procurement and prestockage are made on components when they are identified as contingency requirements. The engineering, logistic, and cost data for all components are organized, coded, and maintained in data banks to assist in base development planning and to maintain up-to-date information.

#### 6—2. Functional Components

*a.* The magnitude of support needed for base development operations requires that an efficient system of planning and executing military construction be developed and followed. One step to more efficient construction support of contingency operations is the increased use of functional component systems. Functional components are provided through the Army Facilities Component System (AFCS), the Navy Advanced Base Functional Component System (ABFCS), and the Air Force Bare Base Mobility Package (BBMP). These systems are discussed in more detail in paragraph 6-3.

*b.* The advantages of using functional component are that they—

- (1) Provide a more effective basis for base development planning.
- (2) Facilitate meeting initial requirement of a contingency situation at the earliest possible time.
- (3) Reduce in-country design, construction effort and construction time.
- (4) Promote uniformity in construction criteria and standards.
- (5) Minimize balance of payment impact

related to both offshore materials procurement and for foreign labor use.

(6) Take advantage of the technology and the industrial capacity available in CONUS to meet oversea base development requirements.

#### 6—3. Prefabricated/Prepackaged Functional Components

Prefabricated and prepackaged components are considered for the broadest spectrum of requirements. Particularly appropriate are those requirements that are repetitive and of significant volume. Some examples are—

*a. Piers.* Units such as the DeLong Pier and the Ammi Pier, together with approach spans, fenders, and lighting equipment.

*b. Electrical Power.* Package units of varying capacity, both low and high voltage, together with the necessary transformers, switch gear, control panels, distribution lines, and insulators. These are designed to cover typical area and installation requirements such as depots, ports, and cantonments, capable of employment in multiples.

*c. Water System.* Complete system equipment for production, treatment, storage, distribution, and use. Package may be designed for varying capacities such as 1,000-, 3,000-, and 5,000-man cantonments, capable of employment in multiples.

*d. Sewage Treatment.* Package treatment plants based on various levels of population or specific-type facilities such as hospitals or cantonments.

*e. Hospitals.* Complete packages containing all items necessary for laboratory, wards, operating suites, pharmacy, mess, nurses' quarters, utilities and laundries, based on prefabricated building cells such as metal buildings and trailers.

*f. Troop Shelters.* Based on prefabricated cellular unit capable of being assembled in multiples.

*g. Support Buildings.* A family of multipurpose prefabricated buildings suitable for use singly or in multiple for warehousing, administration, supply, post exchanges, and other similar-type facilities.

*h. House Trailers.* For BOQ, BEQ, or special office requirements.

*i. Laundries.* Trailer equipped with commercial washing machines and dryers, to include power generator but requiring water source.

*j. Heating and Cooling Units.* Package units for various size and types of space requirements.

*k. POL System.* All-inclusive various size plants from terminal to storage to dispensing with necessary tanks, pumps, and pipelines.

*l. Maintenance Shelters.* A family of prefabricated buildings that can be used singly or in multiples for aircraft and vehicle maintenance.

*m. Refrigerated Storage.* A cellular unit that can be combined in multiples to provide extensive refrigerated storage at depots, ports, and support centers.

*n. Landing Mats.* A family of landing mats adequate for the construction of airbases/airfields for aircraft, both tactical and logistic.

#### 6—4. Characteristics of Functional Components

Desirable characteristics of functional components for construction include—

*a.* Mobility and durability consistent with the function to be performed.

*b.* Standardization and uniformity among the services; for example, to develop and prestock a personnel shelter that will meet the requirements of more than a single user is simpler and more efficient than to develop a different make and model for each separate user.

*c.* Commercially available off-the-shelf items to the maximum extent.

*d.* Economically recoverable for use at other locations.

*e.* Adaptability to use in multiples when feasible and required.

*f.* Minimum construction requirements.

#### 6—5. Systems In-Being

*a. The Army Facilities Components system.*

(1) *The AFCS.* The AFCS is integral to base development planning. The AFCS series of technical manuals provides a simple, logical means by which the construction materials and effort required for engineer support of a military operation can be determined. The planner must be familiar with these manuals because

they provide a basis for description of Army facilities used in base development planning.

(a) TM 5-301 is basically the planner's manual explaining the concept and use of the system. It contains an abbreviated listing of all the equipages and facilities in the system and a detailed listing of the installations in the system. It also lists the cost, shipping volume, and shipping weights of material. In addition, the approximate construction effort in man-hours is computed for each facility and installation.

(b) TM 5-302 is designed for use primarily by engineer units engaged in the construction of Army facilities and installations. It contains construction site layouts, plans, and details for the facilities and installations. It tabulates bills of materials for these facilities and installations.

(c) TM 5-303 is intended for use by planners, construction units, and supply agencies. Construction data have been developed on the "building-block" concept. The basic building block is a facility; others are installations and equipages. This manual contains descriptions of all facilities and equipages and a listing of all items in each facility and equipage. Each item in a facility or equipage is identified by a Federal stock number, abbreviated description, unit of issue, and the quantity required. The dollar cost, shipping weight, and volume for all materiel, together with the construction man-hours, are included in the description heading.

(d) Automatic data processing (ADP) aspects. All data published in TM 5-301 and TM 5-303 are coded on magnetic tape for use in digital computers. This simplifies updating as changes occur in the building blocks. The use of ADP is also a means of providing current data to supply agencies and overseas commands when requested. Revised ADP systems to support base development planning are being developed by the Directorate of Military Engineering, Office, Chief of Engineers (OCE), Washington, D.C.

(2) *Responsibilities for development.* AR 416-16 sets forth responsibilities for development and maintenance of the AFCS. The Chief of Engineers has the major responsibility for the development and maintenance of the AFCS. Staff agencies, major commands, and other elements of the Army that have missions in theaters of operations requiring construction—peacetime and contingency—are responsible for submitting operating criteria and general military characteristic of these facilities to the OCE on an annual basis. The Army component commanders in

a theater of operations provide the Army Materiel Command (AMC) with time-phased AFCS requirements for each base development plan requiring AMC support in their respective OP-LAN. The AMC is responsible for providing staff guidance to commodity commands and other activities in support of the AFCS to include-

(a) Cataloging and standardization of materiel included in the AFCS.

(b) Procurement, distribution, and storage of equipment in required quantities for CONUS installations, oversea commands, other user agencies, including development of Army-wide supply and maintenance policies, systems, and procedures for materiel.

(c) Insuring timely supply of items included in the AFCS.

(d) Developing transportation data and initiating necessary action to insure shipment of items.

(e) Conducting necessary planning to insure supply and shipment of Defense Supply Agency/General Services Administration source items that are the logistic responsibilities of these agencies.

(f) Upon receipt of list of AFCS required, obtaining project codes to identify each assembly package and publishing these codes and other required information for all concerned.

(g) Providing guidance for including AFCS in operational project, as specified in AR 725-65.

(3) *Description of the system* Two groups of data are developed for the AFCS:

(a) Data that are related to combat support are identified with the combat zone in a theater of operations.

(b) The data related to combat service support are identified with the communications zone.

*b. The Navy Advanced Base Functional Component System.*

(1) *General.* The Navy ABFCS is a grouping of personnel and/or material designed to perform one of the specific tasks of an advanced base. The component as broken out by the Navy contains the technical personnel and the technical equipment necessary for the performance of their tasks, including, as pertinent, workshop housing, vehicles, boats, shop and office equipment, and a 30- to 90-day initial supply of consumables. The functional components are given names to indicate their function and unclassified code numbers consisting of a letter and number combination to provide easy reference.

(2) *Scope.* The Navy system encompassed more than 300 functional components, covering practically all significant tasks normally performed at various types of advanced bases. The entire list is subdivided into major functional groups, indicated by the letter prefix. Some examples are-

A—Administration.

B—Harbor Control and Defense.

C—Communications.

D—Supply.

E—Ship and Boat Repair.

F—Cargo Handling.

G—Medical and Dental.

H—Aviation.

J—Ordnance.

P—Construction and Public Works.

This system is unique in that the Navy construction troop units are a part of the functional component system. For example, a mobile construction battalion (MCB) is a P25 Functional Component. A construction battalion maintenance unit (CBMU) is a P5 Functional Component.

(3) *Use as a planning tool.* The ABFC system provides a means of planning by the selection of functional building blocks, each designed to provide for the performance of a specific task to be accomplished at the advanced base. In practice, broad base development planning is expressed in terms of complete functional components. When planning is done in more detail, specific functional components are tailored by the reduction, omission, or the addition of quantities of specific items to the standard outfitting lists. Also, those components which include covered working space, living accommodations, etc. may be designated as "tents or huts," and further refined as "tropical, northern, or arctic." This furnishes a means of providing components compatible with tables of organization (TO) standards and climatic conditions. Selection of a given functional component, appropriately designated, provides the number of square feet per man and the desired permanency of construction, in accordance with Navy standards. Once the total package has been selected, the following information can be derived quickly:

(a) The buildings and structures required.

(b) Materials and equipment for utilities.

(c) All equipment and material required to outfit the base.

(d) Initial stock of supplies.

(e) Military personnel required to operate the base, by rank and rating.

(f) Approximate land area needed for buildings and structures, cantonments, etc. Planning data include the land area required to provide space for each component. This constitutes a starting point for site planning without necessarily making detailed layouts of groups of buildings, structures, etc.

(g) A basis for estimating the construction effort required.

c. *The Air Force Bare Base Mobility Package.* The Air Force BBMP includes lightweight, small, easily erected, air-transportable structures and other facility components as well as construction equipment and supplies. The packages are organic to the deploying units. The structures and other components, erected by the personnel of the deploying unit, provide minimum essential facilities on an austere space basis and can be quickly repackaged, transported, and erected at another location.

## 6—6. Standards of Construction

The theater commander establishes standards of construction to insure uniformity of construction quality throughout the contingency area for all services. The basic principle in establishing standards is to provide the required facilities at the least cost in resources for the expected duration of use. Long-life materials may be used for short-time requirements provided increased costs do not result. While standards are primarily reflected in quality and durability of the completed facility, they have a definite impact on living and working conditions; e.g., masonry versus tents for living shelters. Running water and waterborne sewage are included in standards because of their impact on living and work-

ing conditions and cost. Categories of standards are based on the military situation, location, environment, anticipated duration of use, latest developments in prefabricated and prepackaged functional components, and cost considerations. As those factors change, a corresponding change in standards may be required. Six standards of construction have been prestructured into the AFCS system. They are identified in the system as follows, except for hospitals: (For greater detail and hospital standards, see FM 101-104, chap 7.)

a. *Standard 1.* No construction effort is programed. Units utilize organic equipment and materials. Personnel and facilities are housed in tents. Pit-type latrines are used.

b. *Standard 2.* Same as standard 1, except that construction effort is programed for clearing site) grading of roads, and erection of critical facilities and utilities. Improvements are confined mainly to those made on a shelf-help basis by the occupying unit using its organic equipment.

c. *Standard 3.* Same as standard 2, except that construction effort and materials are furnished to erect buildings for administrative and other major operational facilities. Water and electrical distribution systems are installed. Roads are stabilized with local materials. There is no waterborne sewage.

d. *Standard 4.* Same as standard 3, except class IV tents with floors and wood frames are provided for housing.

e. *Standard 5.* Same as standard 4, except that buildings are constructed for all purposes.

f. *Standard 6.* Same as standard 5, except that waterborne sewage is installed and all roads are paved.