

CHAPTER 2

AFCS TERMINOLOGY AND DATA

2-1. AFCS

AFCS is a system that helps all levels of military planners, supply agency personnel, and construction personnel who have a role in providing temporary Army facilities in support of contingencies.

2-2. BUILDING BLOCKS

AFCS uses a building block concept for maximum flexibility. Items, facilities, subfacilities, installations, and components, explained in paragraph a through e below, make up the building block system:

a. Item. An item is any construction material or equipment used to make up a facility. Each item has an associated NSN, description, unit of issue, and quantity. The following are examples of items:

- 5510-00-134-3964 Lumber Softwood Dim 2 Com 2x4x12 BF (Qty)
- 5315-00-164-5126 Nail Common 3d LB (Qty)
- 5530-00-262-8182 Plywood AB Ext 5 Ply 3/4x48x96 in SH (Qty)

Tabulations of AFCS items required for each facility can be found in TM 5-303.

b. Facility. A facility is a group of items that provides a service. A facility can also be an item of equipment that enhances a function by providing specific physical assistance. Each facility is assigned and identified by a unique number. The following is an example of a facility description listed in TM 5-301-1:

14185AA Company Headquarters Building,
600 SF, wood construction, w/concrete floor,
temperate climate

Each facility has an associated facility number, description, unit of issue, shipping volume, shipping weight, and cost. Several facility numbers may be required to complete a functional facility. For example, constructing a finished and usable barracks building might require:

- (1) The basic building.
- (2) Additional bay (to extend building to some desired length).
- (3) An insulation package.

(4) Electrical lighting and distribution package.

Users, therefore, should carefully read the facility description in TM 5-301 or TM 5-303 so that all necessary components are acquired.

c. Subfacility. A subfacility differs from a facility only in its use in TM 5-303 (BOM). A subfacility reduces the repetitive listing of a facility's construction materials. When a facility is used as a subfacility, the entire subfacility is treated as one item of the major facility listed in the BOM. The subfacility's name and a short description of it will appear in lieu of the NSN and shipping/logistics data for each of its items. The subfacility's entire BOM will appear only where it is initially listed as a facility.

d. Installation. An installation is a group of facilities designed to provide a specific service or support to a military function in a TO. Installations are listed in the Installation Planning Tables of TM 5-301 and in volume one of TM 5-302. Each installation has a unique associated number (two alpha and four numeric characters). For example:

- NT1131 Troop Camp, 250-man, temperate climate, temporary standard
- DA1061 Ammo Storage, 12,000-ton capacity for temperate climate

The shipping volume, shipping weight, cost, and labor requirements for each installation are also provided.

e. Component. Component is a generic term sometimes used to refer to any facility or installation in AFCS. It generally refers to one or more of the system's building blocks.

2-3. PLANNING TABLE

A planning table is a tabulation of installation and facility logistical, cost, and engineering construction data from TM 5-301.

2-4. DESIGN CRITERIA

a. Site Adaptation. Design assumptions and criteria, sometimes considered helpful for adapting a structure to specific site conditions, are shown in the working drawings of TM 5-302. Included is information such as maximum

stresses of structural members, assumed concrete strength, minimum soil-bearing capacities, and thermal (climatic) operating range. Those data can be used by qualified personnel to modify the proposed facility if materials or conditions differ from what is listed in the manual.

b. Safety. Because of the short design life of the facilities, the minimum safety factors for ensuring personnel and equipment safety during the mission are used. Therefore, AFCS standard designs do not necessarily meet building codes.

2-5. CONSTRUCTION STANDARDS AND PROCUREMENT CONSIDERATIONS

Construction standards are based primarily on the length of the contingency operation and are set by the theater commander. The following construction standards conform to Joint Chief of Staff requirements and are included in the facility/installation descriptions printed in TM 5-301:

- Initial (INT) – up to 6 months.
- Temporary (TPR) – up to 24 months.

2-6. TYPES OF STRUCTURES

AFCS has two basic types of buildings: disposable and relocatable. Selection is based on mission requirements and resource availability.

a. Disposable. Wood frame, block, concrete, or any other material formed at the site and having little or no salvage value.

b. Relocatable. Pre-engineered, panelized buildings, or any other structure having 85-percent recoverability.

2-7. MATERIAL WASTE AND LOSS

Allowances are made for losses from breakage during handling and waste during cutting and fitting. Table 2-1 lists the percentage of extra materials included.

2-8. CLIMATIC ZONES

In order to provide safe, effective, and habitable shelters, all AFCS designs take into consideration the climate of the facility's intended use. AFCS facilities are designed to operate in one or more of four main climatic zones: temperate, tropical, frigid, and desert. Appendix D explains those climatic zones in detail.

2-9. CONSTRUCTION EFFORT

The TM 5-301 series gives the estimated construction man-hours required to erect or construct each facility or installation. Those estimates are based on the use of standard construction practices and procedures promulgated by the Engineer School; the estimates do not, however, include administration, mobilization, planning, or work lost by weather delays. The estimates do include the actual construction time required for skilled and unskilled personnel working in and major equipment operated in the temperate zone. Estimates for other climatic zones were obtained with the following adjustment factors:

- Temperate 1.00 (base)
- Tropical 1.45
- Desert 1.25
- Frigid 2.41

The various categories of labor that may be involved in a project's construction are described in paragraphs a through c below.

a. Vertical Labor. The vertical labor category includes skilled specialties such as:

- Carpenter/mason
- Electrician
- Plumber
- Diver
- Metal worker
- Pipeline specialist

b. Horizontal Labor. The horizontal labor category generally includes equipment operators such as:

- Lift/load equipment operator
- Construction equipment operator
- General construction machinery operator
- Dump truck operator
- Concrete/asphalt paving equipment operator
- Quarry machine operator
- Lightweight vehicle/power generator mechanic

c. General Labor. The general labor category includes all unskilled workers assisting horizontal or vertical laborers. General laborers perform tasks requiring no prior training or skill or use of mechanical or electrical equipment.

Table 2-1. Extra materials included for waste and loss

Materials	Additional Percent Included in BOM for Waste and Loss
Bolts	10
Cement	10
Caulking and Curing Compounds	10
Electrical:	
Conductor	10
Equipment	None
Fixtures	None
Hardware	10
Poles	10
Wiring Devices	10
Trim	10
Glass Substitute	10
Lumber:	
Framing	15
Sheathing	20
Roofing	20
Flooring	20
Trim	10
Form work	10
Mechanical Equipment	None
Nails:	
Roofing	15
All other	10*
Paint	10
Plumbing:	
Fixtures	None
Fittings	10
Pipe	20
Pipe Insulation	10
Rivets	10
Roll Roofing	20
Steel:	
Structural Shapes	None
Sheet Metal	10
Sewers and Drains:	
Concrete Pipe	20
Fiber Pipe	05
Welding Rod	100

*Reported experience with troops and troop construction indicates a need for more than a 10-percent wastage factor for nails.

Table 2-2. Ranges for operational conditions

	Air Temperature °F	Ambient Conditions Relative Humidity %	Solar Radiation Btu/ft ² /hr
Temperate Zone:			
Intermediate Hot Dry	70 to 110	20 to 85	0 to 360
Intermediate Cold	-5 to -25	tending toward saturation	negligible
Tropical Zone:			
Wet Warm	75	95 to 100	negligible
Wet Hot	78 to 95	74 to 100	0 to 360
Frigid Zone:			
Cold	-35 to 50	tending toward saturation	negligible
Desert Zone:			
Humid Hot Coastal Desert	85 to 100	63 to 90	0 to 360
Hot Dry	90 to 125	5 to 20	0 to 360

2-10. ENGINEER UNIT CAPABILITIES

a. Derivation of Productivity. Through the use of DA guidance, the productive capabilities of various engineer units have been estimated in terms of man-hours per month. The productive capabilities of various engineer units (summarized in appendix E) were derived by (1) deducting the nonproductive units from the overall number of units for administrative, maintenance, mess, communication, and medical personnel and operators of administrative vehicles and (2) degrading the overall unit numbers by enemy actions and movement factors as shown in AR 570-2. The work period for all units is 10 hours per day, 7 days per week, 365 days per year. The functional skill groups listed in appendix E should not be interpreted as the sum total of skills available in the unit, but only as an indicator of unit capabilities. For more details on mission, assignment, and capabilities of each engineer unit, refer to FM 101-10-2.

b. Reduced Productivity. The productive capabilities indicated in paragraph a above do not take into consideration several other aspects of unit capabilities. Additional reductions in the productive capabilities of engineer units can result from equipment processing following debarkation, area orientation, job organization, and acclimation of troops because of a change in climate and significant changes in altitude. As a conservative guide, productivity should decrease by 70 percent during the first 15 days when acclimation, equipment processing, area orientation, and job orientation are involved. When acclimation is not a factor, productivity should decrease by only 50 percent during the first 15 days.

2-11. LOGISTICAL AND COST INFORMATION

a. The material cost data and logistical data shown in TM 5-303 (BOM) are current as of the date of publication. Transportation costs for shipment are not included.

b. The user must be careful when unpacking materials and equipment. The user should check for missing materials immediately so that requisition procedures can be started, if necessary. Also, since the length of certain structural members is critical, components such as columns and certain roof truss pieces and roof and floor joists should be set aside in order to ensure that they are not cut up for use as smaller pieces. The user should also ensure that packing materials are removed carefully and not damaged, since those materials may be items (such as furring strips, etc.) needed for construction.

c. Aggregates for concrete cannot be requisitioned from TM 5-303 (BOM). AFCS logistics data is based on the assumption that aggregates will be available within 5 miles of the construction site and can be acquired locally. Construction planners should ensure that necessary aggregates are available when the site is known.

2-12. OPERATIONAL CONDITIONS

Operational conditions are the climatic conditions to which personnel and materials may be subjected during military operations. Operational conditions are stated in terms of ambient temperature and humidity under standard conditions of ventilation and radiation shielding. Table 2-2 lists the ranges of operational conditions for

Table 2-3. Storage and transit conditions

	Induced Air Temperature °F	Induced Relative Humidity %
Temperate Zone:		
Intermediate Hot Dry	70 to 145	5 to 50
Intermediate Cold	-10 to -30	tending toward saturation
Tropical Zone:		
Wet Warm	80	95 to 100
Wet Hot	90 to 160	10 to 85
Frigid Zone:		
Cold	-35 to -50	tending toward saturation
Desert Zone:		
Humid Hot Coastal Desert	90 to 160	10 to 85
Hot Dry	90 to 160	2 to 50

each climatic region. The temperature of any type of material may vary considerably from the operational temperature because of the effects of solar radiation, shading, internal heat sources, thermal mass, and heat-transfer characteristics.

2-13. STORAGE AND TRANSIT CONDITIONS

Storage and transit conditions are the air temperature and humidity conditions to which material may be subjected during storage and transit (such as inside a military-owned demountable container (MILVAN) or unventilated field storage shelter, under a tarpaulin, in a tent, or in a railway boxcar). Table 2-3 gives the estimated ranges of the induced temperature and humidity for each climatic region. Construction materials and equipment used in AFCS must be protected from prolonged exposure to adverse conditions.

2-14. SITE ORIENTATION

a. Climatic Factors. Building orientation can take advantage of natural attributes, such as solar heat gain (or shading), prevailing breezes for cooling, and placement of buildings on slopes facing the equator for added warmth in cold climates. Figure 2-1 demonstrates the passive use of climatic factors.

b. Site Adaptation. Generally, AFCS installation plans assume a flat site; flat sites, however, rarely occur in the field. Therefore, it is necessary to perform a site analysis that considers factors such as slope, drainage, existing vegetation, access to and from the site, dispersal,

camouflage, and climate. AFCS utility design and the BOM are based on a specific layout on a flat site. Actual utility design must be based on actual site conditions with the BOM adjusted accordingly. Since the installation layouts provided are based on ideal conditions, the user must revise the layout, as required, based on the site analysis.

2-15. FACILITIES FOR INITIAL PERIOD (UP TO 6 MONTHS)

a. Facilities should be only those austere, quickly erectable, mission-essential facilities required to support the troops and their equipment.

b. Studies reveal that very few common construction items will be acquired and delivered within the initial 6-month period of a contingency operation. Therefore, construction material critical to mission success should be stockpiled by the appropriate MACOM and should be air-transportable or pre-positioned. Pre-positioning and local theater procurement are normally the best ways to ensure that materials are available when needed because high-priority logistics requirements for mission material and personnel are in effect early.

c. Operational planners for initial facilities should ensure that (1) the facility list includes only critical facilities, (2) air or sea transport will be made available, and (3) procurement, production lead time, and transport and erection time are adequate to support the operation plan. Normally, organic equipment and facilities and Common Table of Allowances (CTA) equipment and facilities should not be duplicated by AFCS facilities.

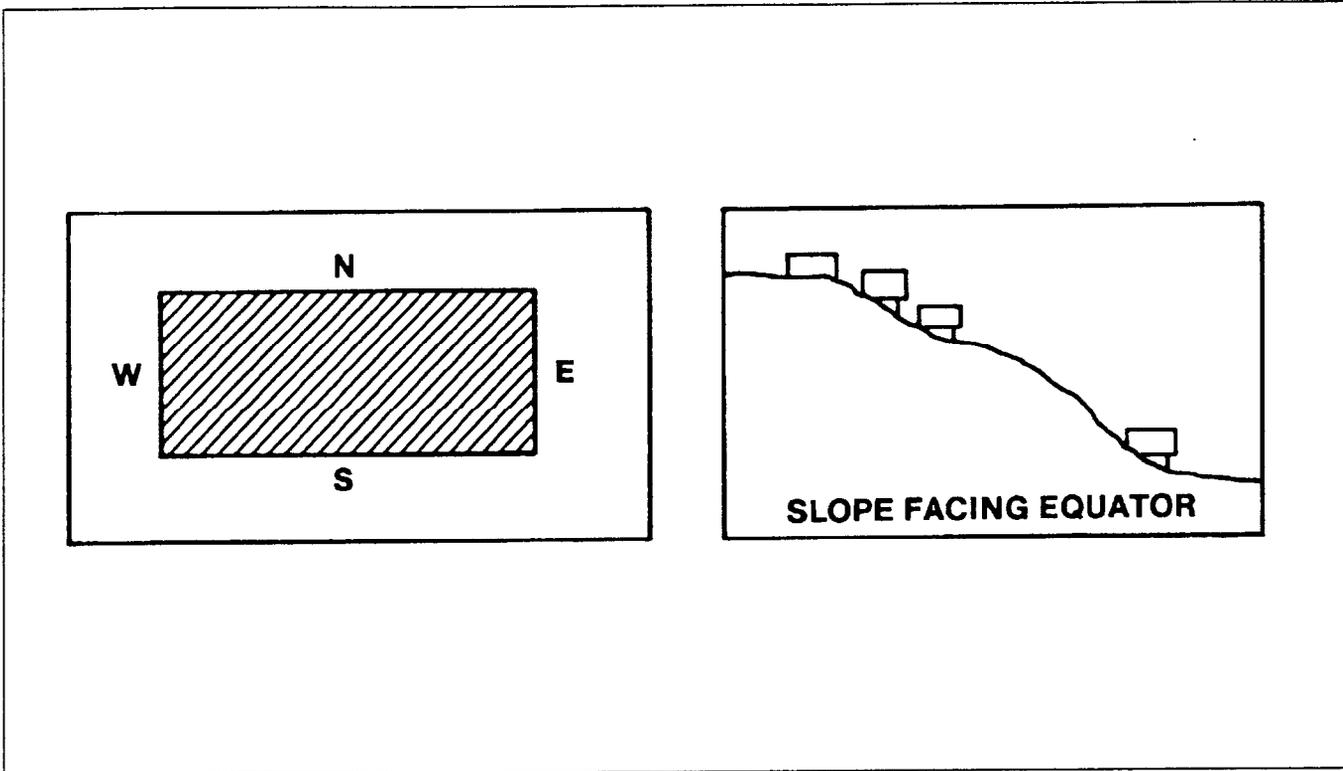


Figure 2-1. Building orientation

d. If delivered first or pre-positioned, temporary relocatable buildings could be erected and used to protect initial and temporary materials, thereby increasing their in-theater life.

2-16. FACILITIES FOR A TEMPORARY PERIOD (GREATER THAN 6 MONTHS)

a. Temporary standards should provide a wider selection of minimum facilities, thereby increasing the efficiency, safety, durability, morale, and health standards of personnel on operations. Temporary standards are normally considered most appropriate in a secure Com-Z area.

b. For local theater acquisition, the theater commander and logisticians should see what is available locally in the priority listed in (1) through (4) below:

(1) Using AFCS plans and the BOM, determine if materials are locally available or adapt AFCS designs to conform to the local building system.

(2) Use local off-the-shelf materials after determining compatibility with organic, CTA equipment or other continental United States (CONUS) components.

(3) Use local materials that can be acquired or manufactured quickly.

(4) Use semipermanent approaches, such as lumber, brick, block, etc., that are common in the local area; also, use nationals skilled in working with the type of construction materials chosen.

c. For CONUS acquisition, the Standard Army supply systems should be used when any of the conditions in paragraphs (1) through (4) below exist:

(1) Needed materials are not available locally or supply is not dependable.

(2) Local economy lead times are in excess of Army Materiel Command (AMC) acquisition and delivery times.

(3) Local materials are not compatible with mission equipment or requirements, i.e., 50-cycle electrical power versus 60-cycle electrical fixtures and material.

(4) Pre-positioning or the early execution of an operational project will satisfy all requirements for necessary construction materials in a timely manner.