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CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN IL F/G 5/2
PREPARING AND COMMUNICATING HABITABILITY DESIGN INFORMATION.(U)

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Technical Report P-121
January 1982

PREPARING AND COMMUNICATING
HABITABILITY DESIGN INFORMATION

by
Roger L. Brauer
Kim Groesbeck
Cynthia McNeilly

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including planning a document, collecting and evaluating resource materials, and writing and formatting habitability design information. Information needs of typical readers are defined, and many examples, including important format features, are provided to assist the readers. Principles of writing habitability design information documents are summarized.

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FOREWORD

This investigation was performed for the Directorate of Military Programs, Office of the Chief of Engineers (OCE), under Project 4A762731AT41, "Design, Construction, and Operation and Maintenance Technology for Military Facilities"; Task A, "Architectural Research and Development in Support of Military Facilities"; Work Unit 001, "Developing Habitability Design Criteria." The applicable QCR is 3.10.001. The OCE Technical Monitors were Robert Shibley and Richard Cramer (DAEN-MPE-B).

This investigation was performed by the Facility Systems Division (FS), of the U.S. Army Construction Engineering Research Laboratory (CERL). The personnel completing the work on this project were Dr. Roger L. Brauer, Principal Investigator, and Mmes. Kim Groesbeck and Cynthia McNeilly, Associate Investigators.

Mr. Edward Lotz is Chief of FS. COL Louis J. Circeo is Commander and Director of CERL and Dr. L.R. Shaffer is Technical Director.



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INTRODUCTION

Chapter 1

Background

Many government and private organizations must prepare standards, criteria, and other forms of design information for use in planning, designing and constructing new facilities, or modifying old ones. The U.S. Army Corps of Engineers is responsible for developing, maintaining, and promulgating architectural and engineering design criteria for the Army.

Design information is prepared for several reasons:

1. An organization may have unique facilities that are not typical of other organizations.
2. Design information helps control construction costs by helping personnel involved in a project make sound judgments about what is needed, what solutions are effective, and what materials may have been successful in the past.
3. Design information helps control facility's quality (functional, technical, etc.)
4. Design information helps standardize facilities.

Although design information is essential to architects and engineers involved in project design, many other people use it also. Managers of facility operations and activities use design information to evaluate existing facilities, plan new facilities, or improve old ones. Others may use the information to manage facilities or the facility spaces. Because design information has a variety of users or readers, it should be written to meet the needs of people with a variety of backgrounds. One problem is that design information is

often written for professional designers and assumes that all readers have a thorough technical background.

Design information is prepared to achieve cost or quality control, to facilitate planning, design, or management, or to standardize facilities; however, these goals are often not met. In many cases, the failures are caused by poor design information. A reader may have difficulty locating information in a document, and even if the information is found, it may be difficult to understand, internally inconsistent, incomplete, erroneous, or in conflict with other documents. The document may be inefficient, requiring the reader to spend too much time locating, reading, or comprehending what is presented. As a result, design information may be ignored, misapplied, or misunderstood. In turn, the facility the reader is concerned with may be non-standard, expensive, of poor quality, or delayed in delivery.

Habitability (defined further in Chapter 2) is concerned with a facility's functional quality. Habitability design information is typical in that it cannot be prepared as a special topic or a separate chapter in a document. The functional quality of a facility is affected by virtually all its spaces, subsystems, characteristics, or components. Therefore, habitability information must be fused into nearly all sections of a design information document. For some topics, habitability may be a dominant concern; for others it may be of less significance. Nevertheless, nearly every aspect of a facility is concerned with the health and safety, performance, morale, and satisfaction or security of its users and occupants.

INTRODUCTION

Chapter 1

Little specialized assistance is found in the literature for preparers of design information. Books on technical writing primarily address preparation of reports, journal articles, and other forms of technical publications. Because preparation of a great deal of design information does not consider the need for habitability information and because of the other issues discussed above, there is a need for habitability design information writing guidance.

These procedures were refined on the basis of the test during the second phase.

Objective

The objective of this research was to develop systematic procedures for formulating and updating habitability design information applicable to mission-responsive military facilities.

Approach

The first phase of this research involved describing the criteria writing process; on the basis of this description, a prototype procedure was developed and tested. The test involved preparing a supplement to Design Guide 1110-3-106, Design Guide for U.S. Army Service Schools. The results of Phase One were discussed in CERL Interim Report P-111.¹

¹ Roger L. Brauer, Methods for Developing Habitability Design Criteria, Interim Report P-111/ADA088011 (U.S. Army Construction Engineering Research Laboratory, July 1980).

FUNDAMENTAL CONCEPTS

Chapter 2

A basic understanding of several concepts is necessary before learning the techniques of communicating habitability design information. These concepts include (1) a definition of habitability and how it relates to facilities, (2) a background in what constitutes design information, and (3) the process used to prepare habitability design information. These concepts are explained in this chapter.

Habitability and Facilities

Habitability is a term used to describe the relationships among built facilities and the individuals, groups, and organizations which occupy and use them. In general terms, habitability is concerned with insuring that missions can be performed in the facilities provided. Habitability is not only concerned with the ability to perform activities efficiently and effectively, but also with the health, safety, satisfaction, morale, and personal and physical security of a facility's occupants and contents.

The relationships among facilities and occupants or users can be viewed as part of a larger model which describes an organization's ability to complete its mission (see Figure 1). Facilities are one of six elements in a mission accomplishment model. To complete a mission, the ACTIVITIES required must be known, sufficient numbers and skills of PERSONNEL must be available, necessary EQUIPMENT AND SUPPLIES must be provided, sufficient TIME must be allowed or TIME for activities scheduled, an adequate FACILITY or place must be provided, and the necessary FUNDS must be available for the other five elements.

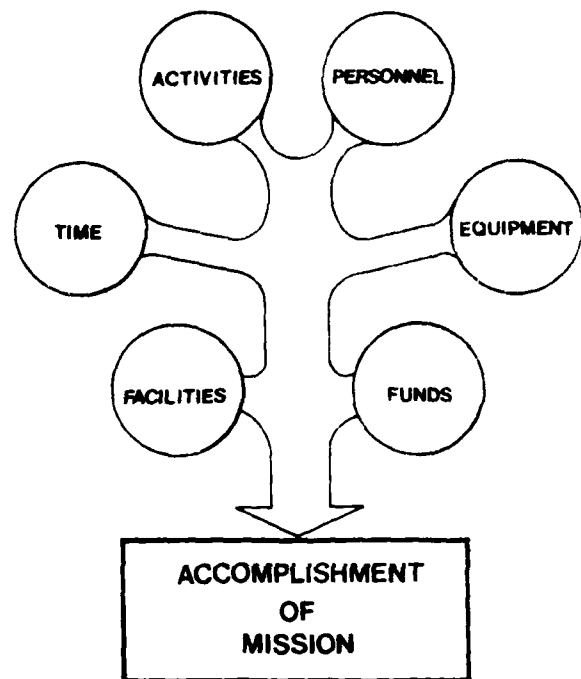


Figure 1. Elements in mission accomplishment.

Habitability is a part of virtually every kind of facility, most of its interior and exterior spaces, and nearly all of its subsystems or components. Therefore, habitability design information must be integrated with the other technical information used to evaluate, plan, or design a facility or its parts.

Design Information Concepts

Some concepts about design information must first be understood before preparing and communicating design information. One concept is that design information is used not only by designers, but by many other people involved in facility evaluation, planning, and management. It is used for small and large projects, renovations, and new con-

FUNDAMENTAL CONCEPTS

Chapter 2

struction. This variety of users and uses must be accounted for in documentation.

Another concept which must be understood is how readers of design information documents search for information (see Figure 2). When looking things up in design information documents, people are most likely to search by type of facility first. They are concerned about offices, schools, hangars, or some other kind of facility. Next, they search by kind of space, i.e., interior or exterior. They may be concerned with the site, the grounds, a classroom, a computer room, or some other space associated with one type of facility. At a more detailed level, readers may be looking for information on specific areas or workstations within a type of space. Design information varies by level or scale. However, regardless of level, readers are ultimately interested in detailed characteristics, such as utilities, environmental conditions, size, arrangement of space, etc. Such characteristics must be accounted for when presenting information to the readers.

Assumptions must be provided when habitability design information is presented. A reader cannot determine whether design information applies to a specific space or facility only by organizing it by type of facility, space, area, or characteristic. Assumptions about what the information contains or how it is used must also be stated. This will help the reader avoid misapplying the documented information. Assumptions regarding a facility's activities, personnel, equipment, and supplies, as well as its time or schedule of use must be stated. A reader can then compare this information and other use and content data that characterize his/her particular space with those

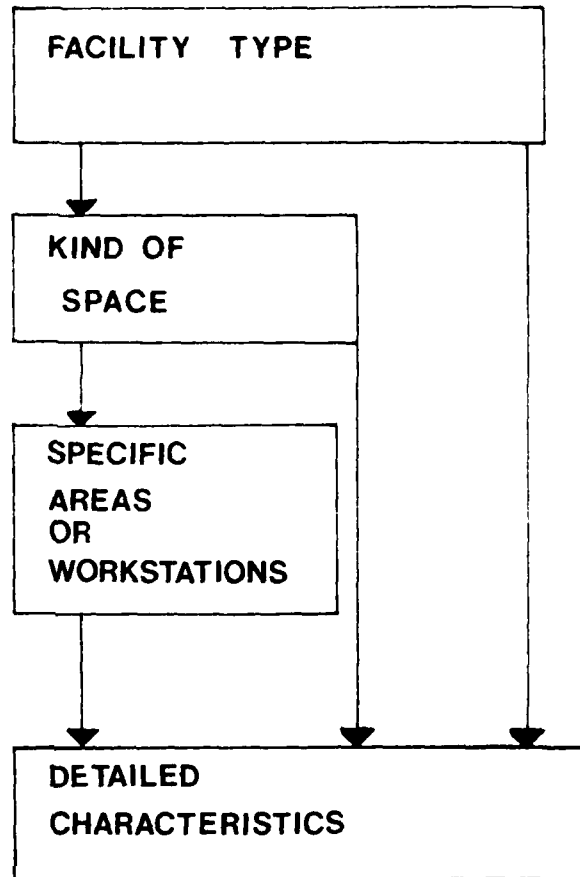


Figure 2. Characteristics describe facilities, spaces, and areas.

assumed for the documented design information.

Different uses of habitability design information require different kinds of information statements. Design information should be sorted into three kinds of statements: requirements, criteria, and guidance (see Figure 3). Because people who do planning must define specific requirements for their projects, design information in the form of typical requirements is most helpful. For evaluation or design of facilities, personnel need standards or criteria to determine whether such requirements are satisfied. If standards do not exist or cannot be written, recommendations can be pro-

FUNDAMENTAL CONCEPTS

Chapter 2

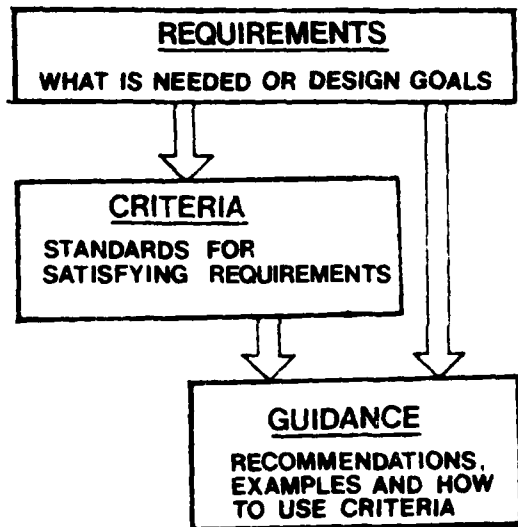


Figure 3. Three kinds of design information.

vided in the form of guidance. Guidance can include examples and illustrations that explain criteria and guidance statements.

The distinction between prescriptive and descriptive forms of information is another concept that must be considered (see Figure 4). Most information found in the literature about facilities is descriptive, telling how things are or can be. It frequently

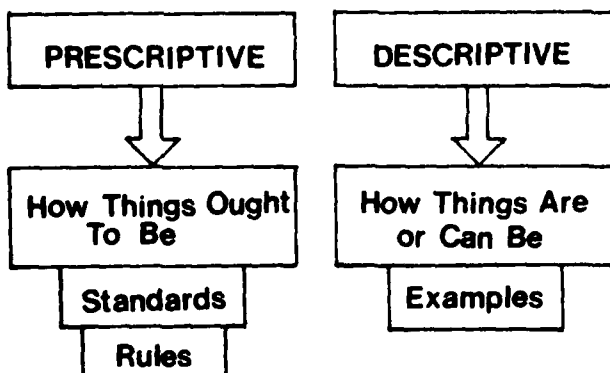


Figure 4. Prescriptive and descriptive information defined.

describes some facility or portion of it that has been newly constructed, renovated, or repaired. This creates a dilemma for the criteria writer, since most design information is written in prescriptive form, stating how things ought to be. While the descriptive resource material contains many useful and innovative ideas, the writer usually must translate it into prescriptive form. Thus, the writer must recognize the difference between descriptive and prescriptive information and learn to deal with both forms effectively.

Habitability design information is provided in many forms. To be most useful in a reference document, (1) it must reflect the varied needs of its readers; (2) it must be organized by facility type, space type, area, or work station and their characteristics; (3) it must state the assumed activities, personnel, equipment, and other items which characterize the facility's use and content; and (4) it must generally be written in prescriptive form. By accounting for quality of habitability design information (see Figure 5), facilities which effectively support the mission and activities of occupants can be achieved and maintained.

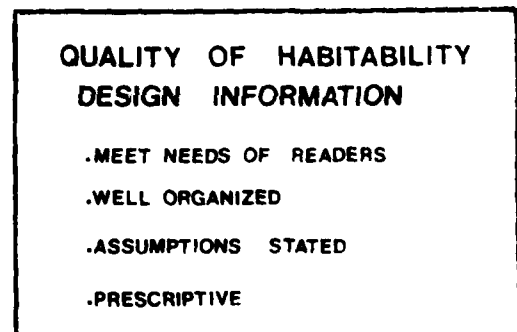


Figure 5. Some characteristics of quality for habitability design information.

FUNDAMENTAL CONCEPTS

Chapter 2

A Procedural Model for Preparing Habitability Design Information

The process of preparing and communicating design information through documentation is composed of six phases (see Figure 6). These six phases are documented in detail in Chapters 3 through 8. The following paragraphs briefly summarize the developer's responsibility during each phase.

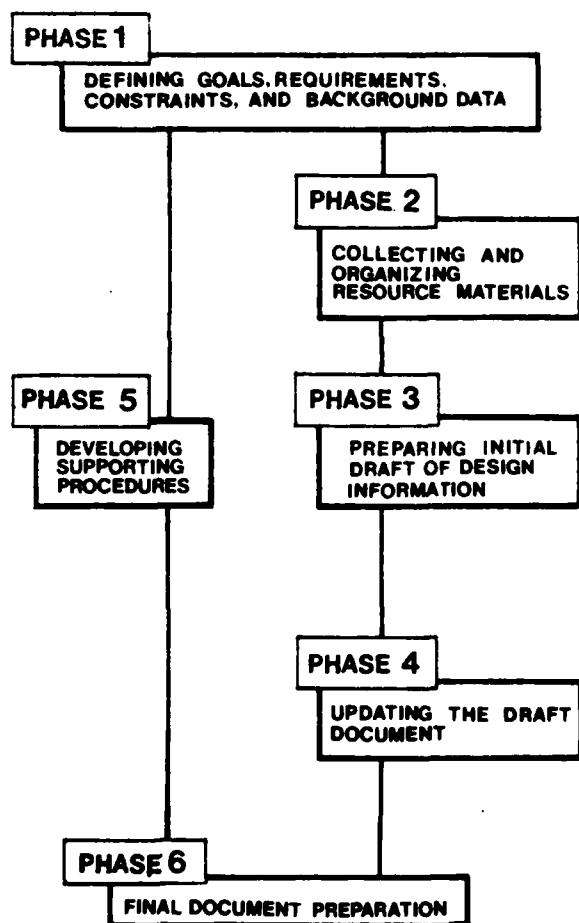


Figure 6. The six-phase process of preparing habitability design information.

Chapter 9 discusses some principles useful to the writer or preparer of design information documents.

Phase 1 -- Defining Goals, Requirements, Constraints, and Background Data

In Phase 1, the developer carefully defines what subject area is to be addressed and prepares a draft outline of the document's contents. He/she establishes the project goals and prepares a schedule of activities. Policies and regulations that constrain the project or the subject area are identified at this time. Finally, the developer forms an understanding of why the document is needed.

Phase 2 -- Collecting and Organizing Resource Material

In Phase 2, the developer collects a variety of information for the project from several sources. (Techniques for searching, indexing, and managing collected materials are discussed in Chapter 4.)

Phase 3 -- Preparing Initial Draft of Design Information

In Phase 3, the developer judges the relevancy of the collected information and organizes it into an initial draft of the document.

Phase 4 -- Updating the Draft Document

In Phase 4, the initial draft is enriched with additional data. Any gaps in the information are filled at this time, and the initial content is validated and expanded.

FUNDAMENTAL CONCEPTS

Chapter 2

Phase 5 -- Developing Supporting Procedures

In some cases, procedures must be developed to help the readers apply the habitability information effectively. These techniques are developed during Phase 5.

Phase 6 -- Final Document Preparation

In Phase 6, substantive and procedural information is organized and formatted for the publication. Illustrations are prepared and contents are checked for style, reading level, and other factors.

PHASE 1- UNDERSTANDING THE PROJECT

Chapter 3

General

Goal

The goal during Phase 1 is to clearly define and document what is to be done to develop habitability information, what subject areas are involved and not involved, when activities must be completed, and what constraints, if any, are placed on the subject area by existing policies and regulations.

Summary

In this phase (Figure 7), the principal writers meet with proponents of the project to find out what is required, how the subject area is defined, and how the information will be used. The writers also investigate policies and procedures that might constrain what information is included in the subject area. Writers meet with individuals typical of those who will use the information to understand why it is needed and how it will be used. They may also visit some user activities. The writers then plan and schedule the activities necessary to complete the document. The findings documented during this phase provide the basis for the remainder of the project.

Skills Required

Phase 1 is done entirely by the person(s) in charge of preparing the design information document. If the person in charge and the principal writer are not the same individual, both should participate to ensure that what is established in this phase gets carried into the product.

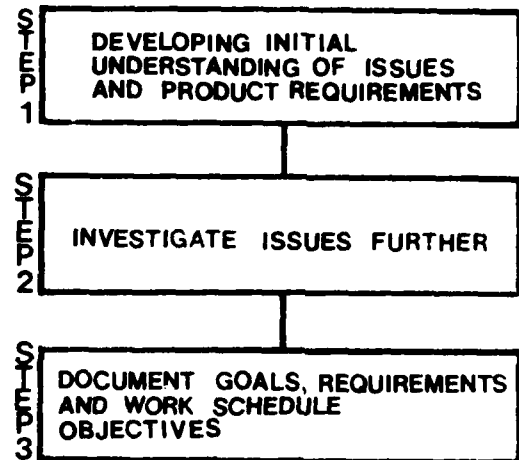


Figure 7. Steps for phase 1.

Discussion

In most cases, writers developing habitability information will be working under a directive or contract. The scope of work may give a schedule of activities for development of a specific document or portion of a document, and tell whether the product (the document) is to be written in general or specific terms. In Phase 1, the writer must develop an understanding of what is called for, an appreciation for the forces creating the requirement, and a keen awareness for any constraints on the product, its content, media, users, and uses.

Define Issues and Project Requirements

1 Step

Objective

To gain a clear understanding of (1) the issues which have created a need for habitability design information and (2) the requirements for the product (Figure 8).

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PHASE 1- UNDERSTANDING THE PROJECT

Chapter 3

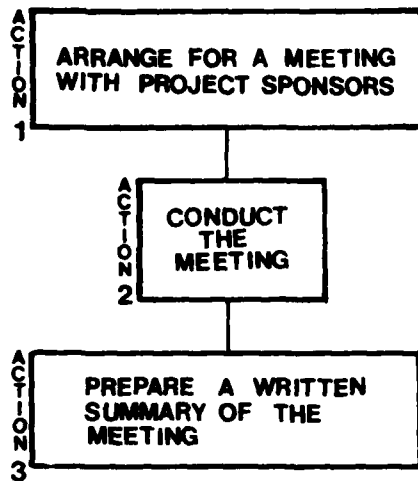


Figure 8. Actions in step one.

Action 1

Arrange for a meeting with project sponsors.

Suggestions

1. Attendees at the meeting should include (a) key writers and project personnel, (b) representative(s) of the proponent organization (project manager and others), and (c) user representative(s).

2. The meeting can be at a site convenient for all parties involved. References or examples at the meeting site may help attendees better understand the need.

Action 2

Conduct the meeting.

Suggestions

1. The meeting usually will be chaired by the project manager from the proponent organization or by the principal writer.

2. An agenda for the meeting should be prepared in advance so that all key points are discussed. An example agenda is shown in Figure 9.

3. It is important that a record of the meeting be made. Someone should be assigned to keep detailed minutes, or the meeting should be recorded.

4. During the meeting, writers should always ask for the names of individuals or organizations who can provide background information and source materials or help writers understand the subject area and what is needed.

Action 3

Prepare a written summary of the meeting.

Suggestions

1. The summary of the meeting should be sent to all meeting participants for review, corrections, and additional comment.

2. The summary should list issues or problems which precipitated the need for habitability information and an objective or goal statement for the document. It should identify and tabulate the facility type(s) and the kinds of space (both interior and exterior), space characteristics, and building features as well as procedures for readers to be covered in the document. The summary should define who will use the document and explain how it will be used. Format requirements and other characteristics must be listed, including a draft table of contents.

PHASE 1- UNDERSTANDING THE PROJECT

Chapter 3

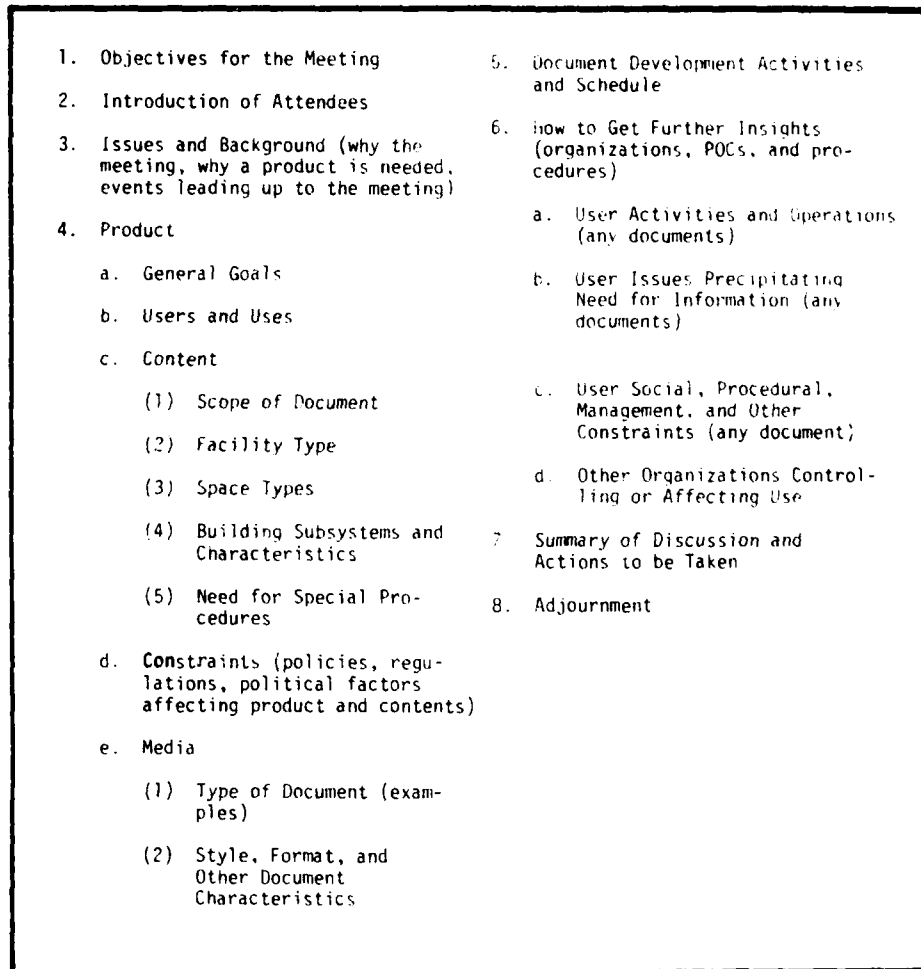


Figure 9. Example agenda for introductory meeting.

Investigate Issues

2^{Step}

Objective

To develop a detailed understanding of (1) facility user activities and operations and (2) constraints which may affect the need for habitability design information (Figure 10).

Action 1

Arrange for site visit(s).

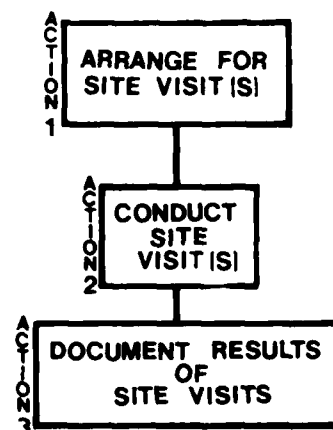


Figure 10. Actions in step two.

PHASE 1- UNDERSTANDING THE PROJECT

Chapter 3

Suggestions

1. Site visits can be arranged through points of contact (POCs) identified in the introductory meeting (Step 1, Action 2).

2. The site visit request should state:

a. What the writer is responsible for and who is requiring the visit

b. What the writer wants to know, learn about, discuss, or see

c. Who the writer wants to talk to or meet

d. An estimate of how much time the writer is asking for

e. The preferred dates for the visit.

Action 2

Conduct site visit(s).

Suggestions

1. When making a site visit, it is important to think of, observe, or discuss (a) task performance as it is affected by buildings, (b) health and safety features, (c) security features, and (d) factors affecting user morale and satisfaction.

2. The following should be done during each site visit:

a. Discuss the issues identified in the introductory meeting (see Figure 9, agenda item 3)

b. Observe user operations and facilities in use

c. Find out what information will help in designing effective facilities or spaces

d. Find out what features users think are important for a facility to have to support their operations and activities

e. Try to understand the management perspective as well as the views of participants in user activities.

3. When conducting site visits, it is important to make notes of conversations and observations. In some cases, it would also be appropriate to take pictures of operations and activities or facility problems which are to be covered in the document. However, approval to take pictures should always be requested.

Action 3

Document results of site visits.

Suggestions

Careful documentation of information gathered at the site of user activities will help in writing the document. It will also help others working on the project understand what was learned.

Document Project Objectives and Schedule

3^{Step}

Objective

To have a written statement that defines basic information for the project and explains earlier directives or contracts in detail. This statement will keep the project on course, give a basis for managing development activities, and provide reference material (Figure 11).

Action 1

Update the summaries prepared in Step 1, Action 3.

PHASE 1- UNDERSTANDING THE PROJECT

Chapter 3

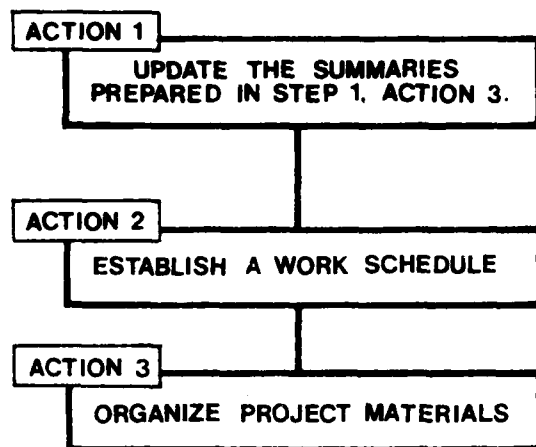


Figure 11. Actions in step three.

Suggestions

Based on the site visits and any other information gathered since the completion of Step 1, update the Step 1 summary. The project goals, the document content, an outline of the document, document users and uses, explanations about format requirements, and other document characteristics should be listed.

Action 2

Establish a work schedule.

Suggestions

1. Prepare a list of activities and tasks needed to complete the project. This should be based on a scope of work, a contract (or directive), and on planning to complete the document preparation.

2. Identify key completion dates for each activity. These should be determined from the contract or directive, and from any additional project management deadlines.

3. Prepare a chart that illustrates the activities and schedule so all project workers can see where the project is going.

Action 3

Organize project materials.

Suggestions

It will help to organize all background material gathered during Phase 1 into a single package. A loose-leaf binder with tabs and an index or organized and labeled project files can be used.

PHASE 2- COLLECT AND ORGANIZE MATERIAL

Chapter 4

General

Goal

To gather and complete general indexing and filing of relevant resource material.

Summary

Phase 2 has two steps (Figure 12):

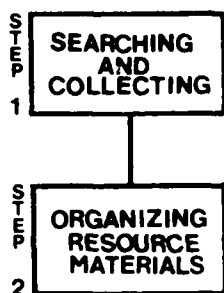


Figure 12. Steps in phase 2.

1. Resource materials are identified, collected, and screened for general relevance.

2. The material is indexed (in general) for content and filed for detailed analysis at a later date. As resource materials are received, they are logged in; a typical recommended form for logging and general indexing is discussed in Step 1, Action 2.

Skills Required

This phase should be done by someone who has some skill in literature retrieval, but the searcher does not have to be an expert on habitability. A general briefing on the subject and keywords or topics to look for should prepare the searcher well enough.

Searching and Collecting

1^{step}

Objective

To plan for and conduct a literature search to help prepare habitability information (Figure 13).

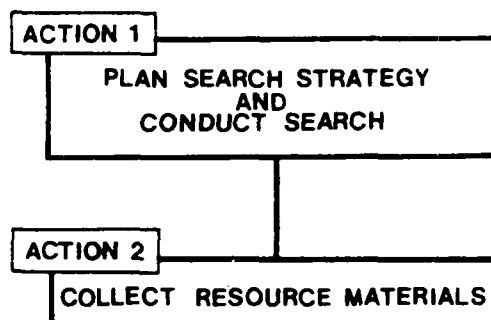


Figure 13. Actions in step one.

Action 1

Plan search strategy and conduct search.

Suggestions

1. Prepare a general topic list of words which may be useful in the searching process for reviewing the thesaurus or index terms used in different indices or reference documents; for example, the list of space types, building characteristics, and other items summarized in Phase 1, Step 3.

2. During the search, the searcher will have to decide whether materials identified only by title or abstract are generally relevant to the project. The basic question to be answered is "Does this reference contain rules or ideas for the subject area of interest?" At this stage, the judgment about what is

PHASE 2- COLLECT AND ORGANIZE MATERIAL

Chapter 4

relevant or not relevant is not too critical. If there is doubt about relevancy, it is better to include the material at this stage and screen it out later on.

3. It is important to outline a search strategy before starting the search. For example, begin with Army documents and locate any requirements, criteria, guidance, rules, or policies that govern the facilities or kinds of spaces identified during Step 1. Next, look for Department of Defense policies and regulations, then for other Government agency or Federal regulations. A search of general literature would be the last step in the strategy.

Action:

Collect resource materials.

Suggestions:

1. Sometimes it will be necessary to order a copy of a resource document. It is important to be aware that ordered materials often take 3 to 6 months to be delivered. Some organizations make documents available, but are not staffed to provide quick distribution. Another factor to be aware of is the cost of ordering these documents. Procurement costs should be included in the project budget.

SPACE TYPE:	HABITABILITY DESIGN INFORMATION PROJECT	DOCUMENT NO.
---	--	--

SPACE TYPES	PAGE	P	D
General Building			
Offices			
SPECIAL OFFICES			
Meetings/Conferences/Training			
Library/Reference			
Reproduction/Photography			
Word Processing Center			
ADP/Computer Center			
Communication/Mail			
Security			

SPACE TYPES	PAGE	P	D
OTHER			
Exterior			
Entry			
General Storage			
Food Service			
Latrines			
Health/First Aid			
Building Operations/Maintenance			

CITATION: *P. ERIC deVARIS, PROPOSED WORKSTATIONS EXPLORE SPECIAL NEEDS OF COMPUTER PROGRAMMER, CONTRACT MAGAZINE, MARCH 1980.*

Form 1

Figure 14. Example of a form for logging in relevant documents.

PHASE 2- COLLECT AND ORGANIZE MATERIAL

Chapter 4

2. In some cases, materials may be borrowed from a library, another organization, or an individual. Because loan periods may be limited, it is necessary to review and abstract these materials quickly.

3. Photocopying is an easy way to get documents which cannot be obtained on loan, have a short loan period, are out of print, etc. Applicable copyright laws should be complied with.

4. Once a document is obtained, it should be logged into a formal recordkeeping system. A complete citation for the document should be recorded. (An example log-in form is shown in Figure 14.) These records are a backup; if material is returned or misplaced, it will be easy to find again. It also identifies items judged relevant to the project. Later on, relevant items will be assigned an identifying project number.

Action 1

Complete general indexing of documents.

Suggestions

It is very helpful at this stage to sort materials by kind of facility or space; only a general indexing or sorting is needed to help those working in subsequent phases. Space types and topical categories must be listed for each document project, since different facilities have different space names (see Figure 16).

Action 2

File resource materials.

Suggestions

Set up a file (cabinet, bins, or folders) to hold resource materials according to the general indexing categories identified in Action 1. Those materials will probably fall into a general category.

Organizing Resource Materials **2** Step

Objective

To index and organize materials collected during a literature search so subject specialists and writers can begin using them to prepare habitability information (Figure 15).

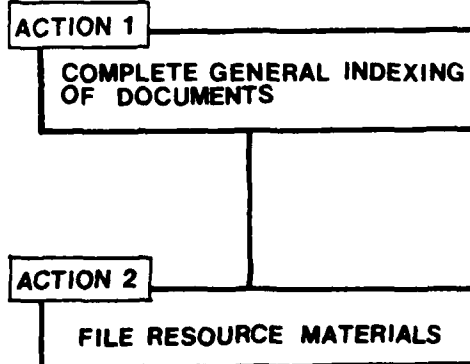


Figure 15. Actions in step two.

PHASE 2- COLLECT AND ORGANIZE MATERIAL

Chapter 4

SPACE TYPE: <i>PROGRAMMER WORKSTATION</i>	HABITABILITY DESIGN INFORMATION PROJECT	DOCUMENT NO.
---	--	---

SPACE TYPES	PAGE	P	D	SPACE TYPES	PAGE	P	D
☐ General Building				☐ OTHER			
☐ Offices				☐ Exterior			
☐ SPECIAL OFFICES				☐ Entry			
☐ Meetings/Conferences/Training				☐ General Storage			
☐ Library/Reference				☐ Food Service			
☐ Reproduction/Photography				☐ Latrines			
☐ Word Processing Center				☐ Health/First Aid			
☒ ADP/Computer Center	<i>106</i>			☐ Building Operations/Maintenance			
☐ Communication/Mail							
☐ Security							

CITATION: *P. ERIC deVARIS, PROPOSED WORKSTATIONS EXPLORE SPECIAL NEEDS OF COMPUTER PROGRAMMER, CONTRACT MAGAZINE, MARCH 1980*

Form 1

Figure 16. Types of space are noted on log-in form.

PHASE 3- PREPARING INITIAL DRAFT

Chapter 5

General

Goal

The goal of Phase 3 is to prepare draft habitability information as early as possible.

Summary

Phase 3 has two steps (Figure 17):

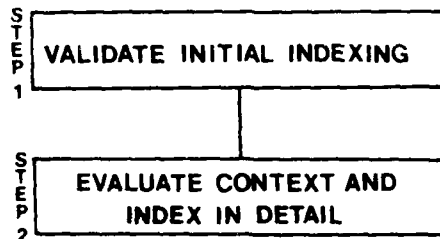


Figure 17. Steps in phase 3.

1. Resource materials collected and indexed (in general) during Phase 2 are evaluated and indexed further (by characteristic). Judgments are validated regarding the resources' relevancy to the project.

2. Whether contents are in prescriptive or descriptive form is determined. Using the detailed indexing as the basis for sorting resource materials, the writer organizes prescriptive information according to the draft outline (Phase 1, Step 3, Action 1); descriptive resource materials are usually not used in this phase.

Skills Required

Those working on Phase 3 must be familiar with building design and habitability standards and must be able to write.

Evaluate Resource Materials

1
Step

Objective

To review resource materials in detail, to determine which are prescriptive, and to establish the facility characteristics each includes (Figure 18).

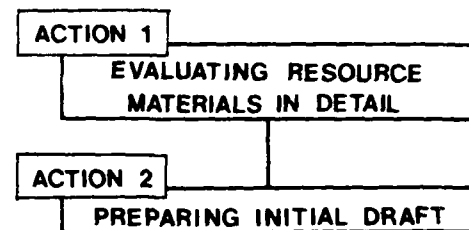


Figure 18. Actions in step one.

Action 1

Validate initial indexing.

Suggestions

Scan each resource to verify that (1) it is relevant to the project, (2) it has prescriptive or descriptive materials or both, and (3) it has information for the spaces shown in the draft outline of the document contents. Assign a document number to those identified as relevant at this stage. (Keep a running tabulation of numbers used.) Make appropriate additions on Form 1 (Figure 19). Return descriptive materials to storage bins for later use.

Action 2

Evaluate content and index in detail.

PHASE 3- PREPARING INITIAL DRAFT

Chapter 5

SPACE TYPE: PROGRAMMER WORKSTATION	HABITABILITY DESIGN INFORMATION PROJECT	DOCUMENT NO. 057
--	--	-------------------------

SPACE TYPES	PAGE	P	D
☐ General Building			
☐ Offices			
☐ SPECIAL OFFICES			
☐ Meetings/Conferences/Training			
☐ Library/Reference			
☐ Reproduction/Photography			
☐ Word Processing Center			
☒ ADP/Computer Center	106	X	X
☐ Communication/Mail			
☐ Security			

SPACE TYPES	PAGE	P	D
☐ OTHER			
☐ Exterior			
☐ Entry			
☐ General Storage			
☐ Food Service			
☐ Latrines			
☐ Health/First Aid			
☐ Building Operations/Maintenance			
☐			
☐			

CITATION: **P. ERIC deVARIS, PROPOSED WORKSTATIONS EXPLORE SPECIAL NEEDS OF COMPUTER PROGRAMMER, CONTRACT MAGAZINE, MARCH 1980.**

Form 1

Figure 19. A document number is assigned to relevant documents.

Suggestions

Make sure all prescriptive documents can be marked up. It is a good idea to have a photocopy to work with at this stage. Read the content of each document carefully. Mark appropriate information by underlining or circling it. Color coding may be helpful. Make notes or place codes in the margin to identify such details as type of space, requirements, criteria, and guidance (R,C,G) activities, personnel and equipment (A,P,E), or characteristics (see Table 1).

Preparing Initial Draft

2
Step

Objective

To prepare the initial draft of habitability information using only prescriptive materials (Figure 20).

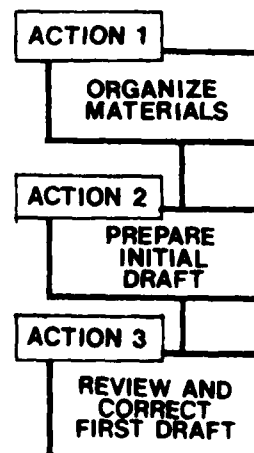


Figure 20. Actions in step two.

PHASE 3- PREPARING INITIAL DRAFT

Chapter 5

TABLE 1. CHARACTERISTICS OF FACILITIES, SPACES OR FURNITURE

- | | |
|---|--|
| <p>A. SPACE/SIZE</p> <ol style="list-style-type: none"> 0. General 1. Area 2. Volume 3. Dimensions, clear span 4. Capacity, utilization 5. Shape, layout, arrangement 6. Relationship to other spaces, adjacencies, affinities 7. Flexibility (used for a variety of activities, adjustable in size, future expansion) 8. Authority for a space <p>B. ACCESS/CIRCULATION/EXITING</p> <ol style="list-style-type: none"> 0. General 1. Visual access, seeing in or out 2. Openings and their characteristics - windows, doors, critical dimensions 3. Access to adjacent spaces 4. Elevators, stairs, escalators, ramps, corridors 5. Directional signage and information 6. Distance to exit 7. Walks, paths, pedestrian traffic 8. Vehicular traffic, streets, roads, parking 9. Railroads 10. Aircraft, taxiways, parking aprons <p>C. UTILITIES/CONTROLS</p> <ol style="list-style-type: none"> 0. General 1. Electrical services 2. Water supply 3. Special gases or fluids 4. Solid waste 5. Sanitary sewer 6. Storm water 7. Special sewer <p>D. ENVIRONMENTAL CONDITIONS/CONTROLS</p> <ol style="list-style-type: none"> 0. General 1. Lighting and controls 2. Sound and noise 3. Thermal conditions, temperature, humidity 4. Ventilation, air flow, air changes 5. Air quality (gases and particulates, filtration) 6. Non-ionizing radiation (rf, microwave, laser, etc.) 7. Ionizing radiation 8. Mechanical space <p>E. APPEARANCE/FINISHES/IMAGE</p> <ol style="list-style-type: none"> 1. General (color, texture, overall image) 2. Floors and floor surfaces 3. Walls 4. Ceiling 5. Trim 6. Landscaping, plantings 7. Walk and parking lot surfaces | <p>F. COMMUNICATION/ELECTRONICS</p> <ol style="list-style-type: none"> 0. General 1. Telephone (instruments, lines) 2. Intercom 3. TV (incl. antennas) 4. Microphone/speaker system 5. Computer 6. Special communication/electronic system <p>G. STORAGE (within a space)</p> <ol style="list-style-type: none"> 1. Bulk space 2. Built-in features (shelves, part bins, closets) <p>H. SECURITY FEATURES</p> <ol style="list-style-type: none"> 0. General 1. Safes, vaults 2. Hardware (locks, bars) 3. Electronic devices (alarms, sensors) 4. Construction features (shielding, reinforcement) 5. Special security features <p>I. HEALTH AND SAFETY FEATURES</p> <ol style="list-style-type: none"> 0. General 1. Emergency equipment (eye wash fountain, chemical shower) 2. Safety signage 3. Guardrails and barriers 4. Sanitation, health 5. Other (not elsewhere covered) <p>J. FIRE PROTECTION</p> <ol style="list-style-type: none"> 0. General 1. Extinguishers 2. Electronic devices (sensors, alarms) 3. Extinguishing systems (sprinklers, gas or chemical systems) 4. Flamespread, burn rating 5. Other (not elsewhere covered) <p>K. MATERIAL HANDLING FEATURES</p> <ol style="list-style-type: none"> 0. General 1. Cranes, hoists, lifts 2. Ramps, docks 3. Freight elevators, dumbwaiters 4. Pneumatic tube system <p>L. MAINTENANCE CHARACTERISTICS</p> <ol style="list-style-type: none"> 0. General 1. Cleaning 2. Durability 3. Access, work space <p>M. STRUCTURAL CHARACTERISTICS AND FEATURES</p> <ol style="list-style-type: none"> 0. General 1. Vibration (isolation, control) 2. Floor loads, water or snow loads 3. Wind loads 4. Other, canopy <p>N. OTHER</p> <ol style="list-style-type: none"> 1. Built-in equipment 2. Built-in furnishings |
|---|--|

PHASE 3- PREPARING INITIAL DRAFT

Chapter 5

Action 1

Organize materials.

Suggestions

1. If possible, sort materials that have been indexed in detail by type of space. Then, scan them for each type of space and make a mental or written note of data identified, i.e., activity, personnel, or equipment, and characteristics.

2. Many resource documents will have multiple applications. For example, they may apply to several kinds of space or only to the building type in general. Resources which have multiple application should be grouped with other materials according to the space type in which they will be used first. After using them in Action 2 (i.e., for the first space to which they apply), mark Form 1 to show that they have been used, and then put them with materials for the next space type to be considered.

Action 2

Prepare initial draft.

Suggestions

1. Use two worksheets similar to those in Figures 21 and 22 to record useful data from resource material. At least one Worksheet 1 and Worksheet 2 is needed for each kind of space.

2. Data which can be applied to all spaces within a facility or a major category of space types are logged on worksheets at the highest appropriate level. This will prevent repetition. Cross-indexing can be used, however, to make sure that readers looking at a particular kind of space do not overlook information located at a higher level.

3. Data on Worksheet 1 define a type of space for a reader or give the reader an orientation. Names of spaces may have different meanings for different people. Worksheet 1 can have five kinds of data:

Introduction: (often not needed) general or background information about a type of space, including a definition for the name, an explanation of how it differs from other types of space, how it is related to other spaces, etc.

Activities: a description of activities which usually occur in a type of space, when or how often they occur, or in what order or sequence they occur.

Personnel: a description of users or occupants of a type of space, including how many there are (typical, maximum, minimum) and how they relate to activities or equipment.

Equipment and Supplies: a description of equipment or supplies typically located in a type of space, and the range of size, configurations, combinations, or quantities that may be found.

Future: (seldom needed) explanations of how spaces may change in the future because of new technology or rapid changes in organizations, etc.

4. Data on Worksheet 2 have requirements, criteria, and guidance statements grouped by characteristic category (see Table 1) for a type of space. When transferring data from resource materials, many gaps may exist. Later they will need to be filled so that there is a requirement statement for every criterion or guidance statement. (Requirements, criteria, and guidance were defined in Chapter 2.) Do not try to fill gaps at this stage. Code

PHASE 3- PREPARING INITIAL DRAFT

Chapter 5

Worksheet 1	Activities/Personnel/Equipment & Supplies
Space type _____	Page _____ of _____

Figure 21. Worksheet 1 for drafting background data.

PHASE 3- PREPARING INITIAL DRAFT

Chapter 5

Worksheet 2 Guidelines	
Space type _____	Page ____ of ____

Figure 22. Worksheet 2 for drafting requirements, criteria, and guidance.

PHASE 3- PREPARING INITIAL DRAFT

Chapter 5

Worksheet **1** Activities/Personnel/Equipment & Supplies

Space type CLASSROOMS Page 1 of 1

USE/ACTIVITIES

Classrooms are typically used by one or more instructors to conduct lectures, presentations, or demonstrations, using a variety of training aids. The primary activities of students in the classroom are seeing, hearing, and writing. Requirements and criteria for effective communication and the ability of the instructor to establish a relationship with students vary with the size of the group, teaching methods, and the media used.

OCCUPANTS

The number of instructors, including teaching aides or technicians, may vary from one to as many as eight or ten. The size of the audience could be as large as 200 people.

EQUIPMENT/SUPPLIES

The instructor needs a platform, chalkboards, tackboards, map hangers, projection screens, and equipment for demonstrations at the front of the room. A lectern, table, or desk may also be needed. Desks may have to be arranged in temporary or permanent tiers to enable students to see the instructor and/or teaching aids. These desks should have a writing surface. Tables and chairs may also be used. Projection or sound equipment that is kept permanently in the classroom should be placed on movable stands or mounted securely. Other demonstration/training aid equipment can be kept in a storage area adjacent to the classroom.

Figure 23. Example of a completed worksheet 1.

PHASE 3- PREPARING INITIAL DRAFT

Chapter 5

Worksheet 2 Guidelines

Space type CLASSROOMS

Page 1 of 3

SPACE - Size

- R Classroom space should be sized to support a variety of classes, instruction methods, and classroom activities.
- C Twenty-five to 35 square feet are required per student. The lower limit of 25 square feet is applicable to classrooms which require only chairs without note-taking arms. The upper limit of 35 square feet is applicable when there is a continuous need for audiovisual presentations, writing surfaces, and the use of reference materials.
- G A space 30 x 50 feet (1500 square feet) will be large enough for 42 to 60 students (including aisles, a teaching station, coat and book storage), regardless of the classroom's configuration.

APPEARANCE/FINISHES/IMAGE

- R Floors should be attractive, easy to maintain, and functional.
- C Although flooring materials can be used for sound control, final selection should include durability, wear, and ease of maintenance. Hard-surface flooring materials wear better, are less easily soiled, and are easier to clean, while carpets and cushioned flooring have better sound control characteristics.

COMMUNICATION

- R There should be enough television monitors to insure that each student can see the television monitor well.
- C Television monitors should be placed along classroom walls; there should be one television monitor per 25 to 35 students. Mounting of monitors on permanent fixtures is preferred for security.

Figure 24. Example of a completed worksheet 2.

PHASE 3- PREPARING INITIAL DRAFT

Chapter 5

letters (R, C, or G) should be inserted in the left column to identify the types of statements.

4. Also see recommendation for Phase 4, Action 3.

5. It is also important to keep track of where data placed on worksheets came from. This can be done by putting the document number (and possibly page number) in a footnote or at the end of a statement. Also, copyrighted material (particularly graphical items selected for guidance) should be noted with a symbol, such as an asterisk (*).

Action 3

Review and correct first draft.

Suggestions

1. It may be helpful to combine material for a type of space on a second set of worksheets and have it typed. An example is shown in Figures 23 and 24. It is easier to see what information has been compiled when it is condensed.

2. If logged criteria and guidance have no requirement statements, appropriate requirement statements can be formulated and added.

3. If requirement statements have been logged, but no criteria or guidance exists, information should be fed back to personnel searching for literature so that appropriate sources can be found. Writers, who are subject specialists, may have suggestions about where to find missing criteria and guidance. Avoid making up criteria and guidance. Criteria should be based on standards in practice. Guidance can be prepared by those who are experienced or well versed in a subject.

PHASE 4- UPDATE THE DRAFT

Chapter 6

General

Goal

To update the initial draft with supplementary habitability information.

Summary

Phase 4 has three steps (Figure 25):

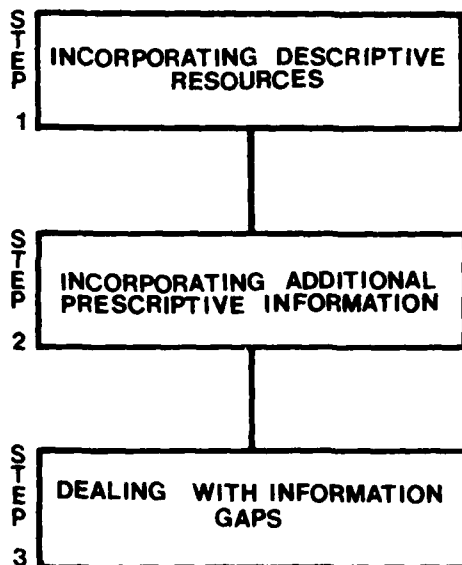


Figure 25. Steps in phase 4.

1. Prescriptive resource materials collected after the first draft was developed are used to fill gaps in information or to update the document.

2. Descriptive resources are reviewed; those having new or unique ideas or examples of effective solutions are added to the draft.

3. A review of the draft is made to identify remaining gaps in information. Efforts are then made to fill in this missing information. Gaps which cannot be filled are noted and recommendations for studies that will help fill them are identified.

Skills Required

Same as Phase 3.

Add Prescriptive Material

1 Step

Objective

To update the initial draft of habitability information with additional prescriptive resource materials (Figure 26).

ACTION 1

EVALUATE RESOURCE MATERIALS AND COMPLETE INDEXING IN DETAIL

ACTION 2

INCORPORATE ADDITIONAL MATERIAL INTO THE DRAFT

Figure 26. Actions in step one.

Action 1

Evaluate resource materials and complete detailed indexing.

Suggestions

Evaluate and index prescriptive resource materials received after the initial draft was developed as described in Phase 3, Step 1.

PHASE 4- UPDATE THE DRAFT

Chapter 6

Action 2

Incorporate additional material into the draft.

Suggestions

Incorporate new prescriptive material into the draft by working with one type of space at a time. Follow the process described in Phase 3, Step 2.

Add Descriptive Material

2^{Step}

Objective

To supplement habitability information written to date with proven solutions and other descriptive resource material (Figure 27).

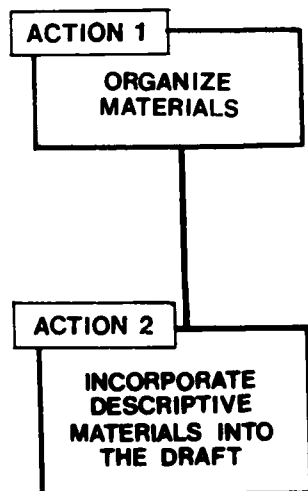


Figure 27. Actions in step two.

Action 1

Organize materials.

Suggestions

1. If some descriptive materials have not yet been indexed using Form 2, complete indexing of those materials.

2. Sort the descriptive materials by type of space and building characteristics. When sorting, materials which apply to many space types should be grouped with the space type which will be worked with first. After being used in subsequent steps, they should be grouped with the next space type to be worked on.

Action 2

Incorporate descriptive materials into the draft.

Suggestions

1. Decide whether ideas from descriptive material are best incorporated as prescriptive or descriptive additions or both.

2. To formulate prescriptive statements or to modify existing ones, write a draft statement. Check to see if it is consistent with other prescriptive statements.

3. As descriptive materials are put on the worksheets, make sure their text and illustrations are consistent with prescriptive statements. Avoid letting it appear that descriptive statements contradict.

Dealing With Gaps

3^{Step}

Objective

To determine if significant information is missing from the draft; if information is missing, to decide what to do about it (Figure 28).

PHASE 4- UPDATE THE DRAFT

Chapter 6

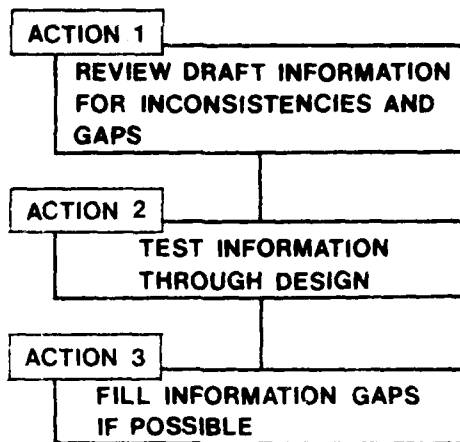


Figure 28. Actions in step three.

Action 1

Review draft information for inconsistencies and gaps.

Suggestions

1. Inconsistent or conflicting information should be resolved.

2. Review the draft information from the document user's point of view. Try to determine whether information that would be helpful to document users is missing. Mark the draft where information is missing (or weak), or list subject areas that need elaboration in the next version of the draft.

Action 2

Test information through design.

Suggestions

1. Evaluate the information collected about each type of space and significant building characteristics to see if (a) guidance illustrates effective solutions or (b) suggested solutions are incorporated into a single illustration or text section.

2. Try to design a space or group of spaces with the information provided. If other information is needed, mark the appropriate location in the draft or add the subject to the list of missing information.

Action 3

Fill information gaps, if possible.

Suggestions

1. Avoid making up information or making seat-of-the-pants estimates. Make sure that information included in the draft can be supported by already-published information.

2. Develop guidance for gaps identified in Actions 1 and 2, and incorporate into the draft.

3. Try to find new resource materials.

4. Contact an expert in the subject field and use the expert's knowledge and recommendations. Be sure to identify the information as having been given by an expert. In other words, cite the source as if it were a document.

5. In some cases, it may be appropriate to generalize from related facilities or resource documents about related facilities. Be careful when making such generalizations, and be sure to document the sources.

6. If gaps cannot be filled, it may be appropriate to ask the project sponsor to fund further research and study. Occasionally, in a draft document, it may be appropriate to state in the text that little is known about the subject or to cite sources where future information may become available.

PHASE 5- DEVELOPING METHODS

Chapter 7

General

Goal

To develop ways users can effectively apply habitability information.

Summary

Occasionally, it is necessary to describe -- sometimes in detail -- how to use habitability information or how to carry out the solutions it suggests. Without such descriptions, the document may not be effective. For example, existing facilities may need to be evaluated; planning, budgeting, requisitions, design, and other activities may be required to complete a project; coordination, approvals, and acquisition of services may be needed; organizations may have to manage the facilities or spaces they are assigned. Although all these activities may need to use habitability information, the way the information is applied may vary by activity or type of facility.

Many information documents will not have to include application methods. But when they are needed, they are developed as described in this section. Phase 5 has three steps (Figure 29):

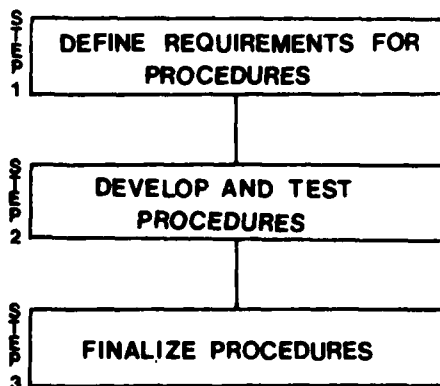


Figure 29. Steps in phase 5.

1. Find out how existing methods work and what is needed to explain, supplement, or replace them. Also identify problems (if any) that exist with current methods.

2. Prepare draft methods which define what must be done, when it must be done, who is to do it, and how to do it.

3. Review and pilot test the methods. Use results from the pilot tests to improve on the draft methods and prepare final versions. Then the methods may be organized into a document independent of the information document or may be incorporated into the main document in Phase 6.

Skills Required

Training and experience with planning or developing processes and methods is an important skill requirement for this phase. Other skills needed will vary with method requirements. Training and experience with facility design, delivery, or management may be needed. Experience or familiarity with Army procedures and organizations will also help.

Define Needed Methods

1
Step

Objective

To find out if methods must accompany habitability information, and if so, who will use them, how they will be used, etc. (Figure 30).

Action 1

Investigate the need for methods.

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PHASE 5- DEVELOPING METHODS

Chapter 7

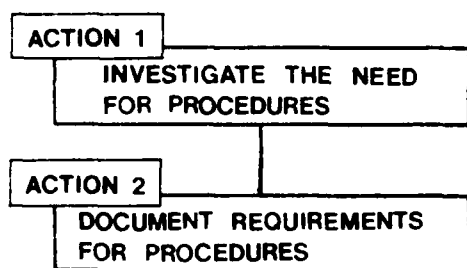


Figure 30. Actions in step one.

Suggestions

1. To find out exactly what kind of methods may be needed, talk to the high-level management people in the Army responsible for implementing the habitability information being developed for the document. Have them describe their view of what kinds of methods would be the most useful to them. Establish a basic goal for these methods and, within this goal, identify who the users of the methods will be, how many people might be involved, what skills and training might be required, and how critical the methods are. Also talk to high-level managers and others about current problems -- ask them to explain why they think things do not work properly now, and why they think new methods will help.

2. As part of the background investigation, carefully establish what the current methods are. Identify how they are completed, what forms are used, how different organizations relate to one another in the process, what the responsibility of each participant is, and the sequence and timing for each part of the process. It is also important to identify the regulations and policies governing current methods. However, be aware that the official description may not always reflect reality; the way things are actually done may be different.

Action 2

Document the method requirements.

Suggestions

Once background information is gathered, document it carefully so it can be used as a reference when the methods are written. It is important to identify and document:

1. Organizations or individuals who are involved in the methods.
2. Organization charts for those involved.
3. Forms that are used.
4. Flowcharts of current and needed methods (to identify the information flow or movement of documents).
5. Training or job aids for use with the methods such as a checklist or manuals.
6. A summary and tabulation of the problems with current methods as seen by those involved or those managing the process.
7. A clear statement of the goal for improved methods.
8. A list of objectives or requirements for the new or improved methods.

Develop and Test Methods

2
Step

Objective

To prepare supplemental methods and test them for effectiveness and simplicity (Figure 31).

PHASE 5- DEVELOPING METHODS

Chapter 7

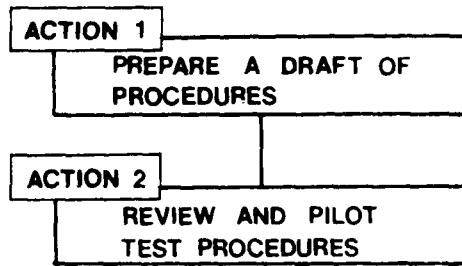


Figure 31. Actions in step two.

Action 1

Prepare a draft of the methods.

Suggestions

1. Methods describe what someone must do and tell them how to do it. (Basic principles for preparing methods are summarized in Chapter 8.)

2. Begin developing methods by preparing an outline for them. This outline can be a flow diagram or time chart which shows the activities to be performed and in what order they are to be done. Note forms that are used in activities, special job aids for specific activities, staffing, or other factors on the chart or diagram.

3. After the basic process is worked out, the methods can be written and illustrated in a draft form following the principles described in Chapter 8.

Action 2

Review and pilot test methods.

Suggestions

1. After drafting the methods, the writer should review them to see if they are clear and understandable. The principles described in

Chapter 8 can be used as a checklist to determine whether the methods are logical, easy to understand, and give the user enough help. The writer should also compare the draft to the statement of goals and objectives or requirements developed in Step 1, Action 2.

2. Draft methods should be reviewed by those sponsoring the project, the high-level managers who identified the need for the methods, by those who may use the methods, and by anyone who helped identify problems with existing methods. Based on these reviews, the methods should be modified, as needed.

3. Pilot tests will help determine whether the methods will actually work. Identify some typical users and have them try to apply the methods as described in the draft to real problems. A pilot test with one or two groups should be enough. Monitor the users' progress to find out if they have difficulty with any portion of the methods and try to determine why. After the methods have been tested, interview those involved to find out how they can be improved or simplified.

4. Keep track of the time people spend on the pilot test. This and other information can be used to make a rough cost/benefit analysis. The basic question to be asked is whether the methods helped in terms of the time and expense needed to complete them.

Finalize Methods

3
Step

Objective

To improve methods based on the results of pilot tests (Figure 32).

PHASE 5- DEVELOPING METHODS

Chapter 7

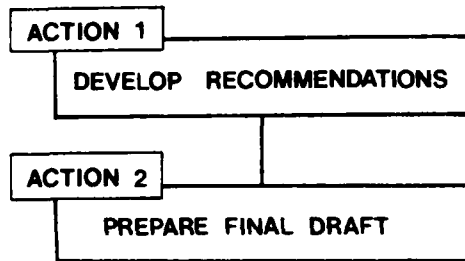


Figure 32. Actions in step three.

2. If the methods are to be included with habitability information in a single document, completion of the final draft of the methods may be delayed until Phase 6.

Action 1

Develop recommendations.

Suggestions

Based on the results of the pilot tests, develop recommendations for improving the draft methods. One factor to consider is whether the methods should be included with the information document as a separate section, or whether two separate documents (one for procedures and one for information) would be better. Also consider whether there are enough staff people to complete the methods, whether the benefits resulting from the methods are worth the time and money needed to complete them, and whether the methods can be simplified in any way. Simplification may require giving up some quality in the output, but may make the methods easier to manage and quicker to execute.

Action 2

Prepare final draft.

Suggestions

1. As final revisions are made to the text and illustrations, a final review should be completed. This review should determine whether the principles for the methods have been satisfied and whether the goals and requirements for them have been met.

PHASE 6- FINAL DOCUMENT PREPARATION

Chapter 8

General

Goal

The goal of Phase 6 is to organize sections developed earlier into final document format and to ensure that they are convenient and effective to use.

Summary

In this phase, sections of the information document prepared earlier are fit together, reviewed, edited, and modified before final manuscripts and artwork are done. Phase 6 has three steps (Figure 33):

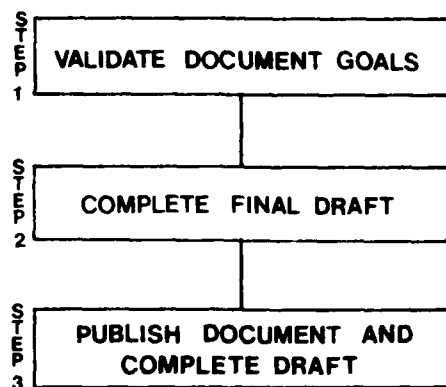


Figure 33. Steps in phase 6.

1. Document goals developed at the beginning of the project (Phase 1, Step 3) are validated before the final manuscripts are prepared.

2. Sections of the document prepared in earlier phases are combined. These sections are thoroughly reviewed and edited to ensure the document has a logical flow, is convenient for the reader, and satisfies other principles for information documents. All manuscript changes and artwork are completed and copies of the manuscript are sent to the sponsor for review.

3. Review comments provided by the sponsor are incorporated, as appropriate. The final manuscript and artwork are sent to the sponsor for typesetting and printing.

At the end of Phase 6, information is put into two different formats. One is a manuscript format (typically double-spaced, full-page-width column) which is convenient for editing and is necessary for typesetting. The other format is a mock-up of the final printed version. A mock-up is vitally important to determine whether page layouts, text-figure relationships, and relationships among other elements are convenient for the reader and will help the reader use the information.

Skills Required

Illustrators are needed to prepare final artwork. Technical editors are needed to edit materials and provide a critical review. Subject specialists, used to develop materials in earlier phases, are needed to defend concepts and preserve technical meaning.

Validate Document Goals

1
Step

Objective

To prepare personnel who will be involved in the preparation of the final draft of the document for their task and to ensure that all are working toward the same goals (Figure 34).

Action 1

Determine if document goals have changed.

PHASE 6- FINAL DOCUMENT PREPARATION

Chapter 8

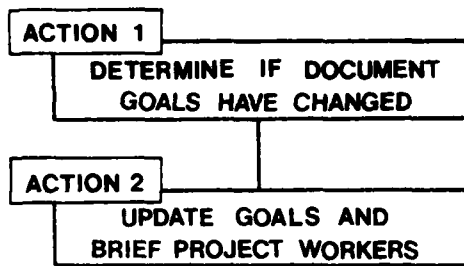


Figure 34. Actions in step one.

Suggestions

In Phase 1, goals for the document were summarized. The goals included an outline of the document, a list of the intended users of the document, a selection of the media to be used, and format and content recommendations. Several months will have elapsed between the time those goals were adopted and the beginning of Phase 6. Because the content of the document has now been developed and new ideas to improve what was envisioned in Phase 1 may exist, the goals must be reviewed before the final document is prepared. Writers should prepare recommendations for the sponsor and obtain approval before any goals are actually modified.

Action 2

Update goals and brief project workers.

Suggestions

Based on sponsor approval, goals for the document should be revised. It would be appropriate to meet with those working on the project to remind them of project goals and to note any changes.

Complete Final Draft

2
Step

Objective

To complete final draft editing, rewriting, and preparation of illustrations, tables, training aids, and other content and format items (Figure 35).

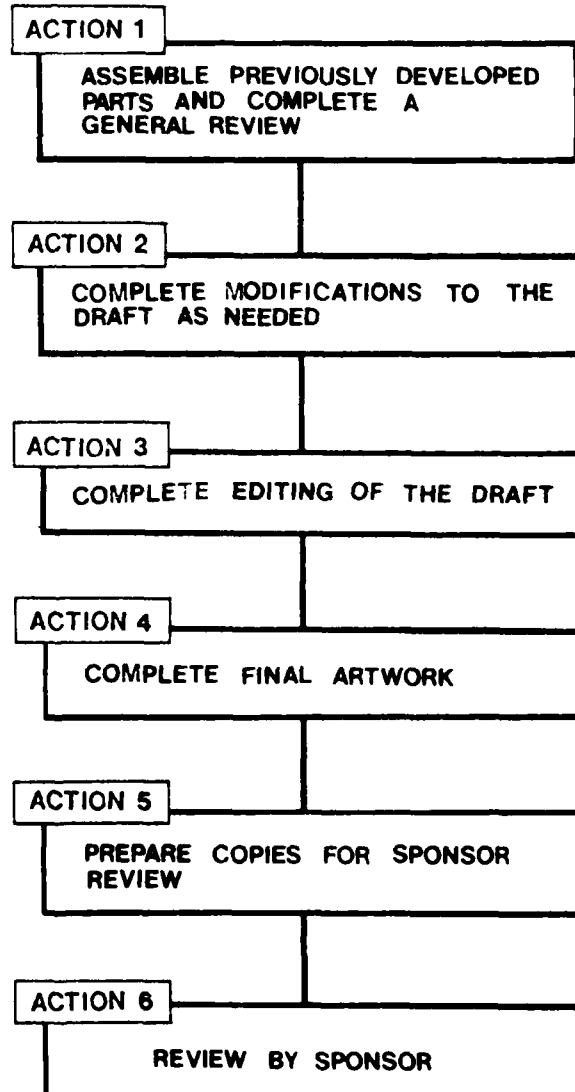


Figure 35. Actions in step two.

PHASE 6- FINAL DOCUMENT PREPARATION

Chapter 8

Action 1

Assemble previously developed parts and complete a general review.

Suggestions

1. If mock-up formats have not been used before, a mock-up should be done. It will be needed to evaluate the document from the reader's point of view. It is also important to keep a copy of the document in manuscript form so editors will have enough space to mark corrections.

2. Subject specialists, editors, and other individuals who can give an independent opinion and understand the needs of the document user should be asked to participate in the general review. Give them a copy of document goals and a checklist of factors to be reviewed and have them write down their comments. Discuss these comments with the reviewers if there is any doubt about what they said.

3. The following factors must be considered during the general review (Note: reviewers should be discouraged from editing the content at this time.)

a. Goals. Does the draft meet the goals for the document (see Step 1, above)?

b. Reader Orientation. Is there enough introduction for the reader to understand what the document contains or how to use it? Are overviews of major sections adequate? Will the reader understand the material as presented or is further explanation needed?

c. Logic and Cohesiveness. Is the draft cohesive? Is the order logical for users? Is there a logical flow from one section or chapter to another?

d. Level of Detail. Does the document generally move from the general to the specific? Does each chapter or section move from general to specific? Is enough detail given? Are there gaps in information?

e. Internal Consistency. Do illustrations correspond to or supplement the text effectively? Is there redundancy? Are cross references among related sections of the document made?

f. References. Are sources of information adequately referenced? Are related Army, DOD, and other Government regulations and documents adequately referenced? Can the content be defended?

Action 2

Finish modifying the draft.

Suggestions

1. Based on the general review, make appropriate modifications and changes.

2. After the draft modifications are completed, check the document once more to see that the factors recommended under Action 1 are adequately provided for.

Action 3

Complete editing of the draft.

Suggestions

1. Complete editing for grammar, style, reading level, effectiveness of illustrations, and adequacy of forms.

2. Update the table of contents based on editing, prepare a list of figures and tables, develop a topical index, etc.

PHASE 6- FINAL DOCUMENT PREPARATION

Chapter 8

Action 4

Complete final artwork.

Suggestions

1. All artwork (line drawings, forms, photographs) should be finalized. Errors should be corrected and any changes needed to improve readability should be incorporated.

2. All artwork should be checked at this stage for copyright. Any artwork taken from copyrighted publications should be identified and a list of such illustrations prepared together with precise reference to their source. The list can be used later to secure publishers' or authors' approval to use copyrighted material.

Action 5

Prepare copies for sponsor review.

Suggestions

1. All corrections and changes should be marked on both the mock-up and manuscript. The manuscript should be checked for conformance with AR 310-2 or AR 310-3, if applicable.

2. After all changes have been made, copies of the two formats should be sent to the sponsor. It is best not to transmit the originals for sponsor review. Keep a backup copy in case the materials are lost in the mail.

Action 6

Review by sponsor.

Suggestions

Send copies to the sponsor for review.

Publish Document

3
Step

Objective

To resolve review comments and submit final manuscripts and artwork (Figure 36).

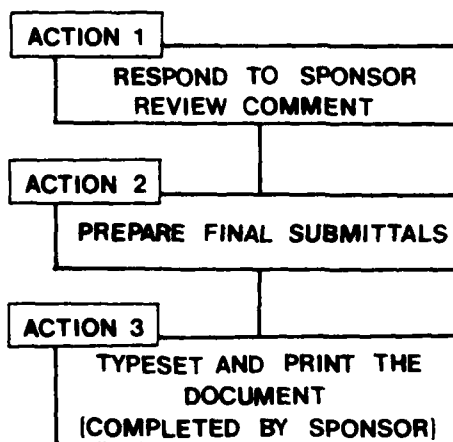


Figure 36. Actions in step three.

Action 1

Respond to sponsor review comments.

Suggestions

Incorporate comments and modify draft document, as appropriate.

Action 2

Prepare final text and artwork.

Suggestions

1. Retype the manuscript and keep at least one copy as a backup. The manuscript will be the official transmittal form and will be used by the sponsor's typesetter.

PHASE 6- FINAL DOCUMENT PREPARATION

Chapter 8

2. Send format and layout recommendations so the typesetter will know how to do page layouts. It may be appropriate to mark up a mock-up to supplement general recommendations and instructions.

3. Tabulate references and source materials. References should be in numerical or alphabetical order.

4. Submit the manuscript, the original artwork (a copy should be kept for backup), format and layout recommendations and instructions, and a list of references and source materials to the sponsor.

Action 3

Typeset and print the document (to be done by the sponsor).

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Chapter 9

General

Objective

To give principles for writing and documenting habitability information.

Background

The writer may need help organizing, drafting, or evaluating material during Phases 1 through 6. This chapter gives basic writing, communications, and habitability information principles, and explanations and examples. (It is assumed that habitability information will be organized into a document which will be published and distributed by the Army, the Corps of Engineers, or a major Army command.) Note that the principles given in this chapter are general recommendations only; the writer will have to judge when it may be necessary to modify them to suit the specific needs of the document.

Readers and Their Needs

As indicated in the Introduction, there are a number of different users for habitability information. Facility users responsible for defining new facility requirements will use it to help them think of things they should ask for, since they are primarily interested in complementing their own experience regarding the kind of facility they need. Those involved in providing solutions for facility user needs will mainly be concerned with the criteria and guidance statements. Those involved in evaluating facilities for adequacy or need for improvement may need all three types of statements.

The Basic Principles

Give Helpful Information and Facilitate Will Use It

This principle addresses document content. Content can be divided into two parts: habitability information and methods for using it effectively. Habitability information must help the reader deal with current facility problems, i.e., must apply to the kind of building the reader is concerned with, including exterior or interior spaces and building subsystems and features. Because many readers are not familiar with all the technologies involved in a facility, they need some procedural help in dealing with criteria. If the criteria do not include topics the reader needs to know about, the document will not be helpful. Also, if a reader is not familiar with the application of certain criteria, the chances of them being used or used effectively are greatly reduced.

Make Documents Easy To Read and Facilitate Will Use Them

This principle deals with writing and communication style. Writing style includes many things, not the least of which is being clear and simple. The style principles presented in this chapter will discuss format (organization of material and page layout) and how to prepare textual and illustrated material. Most of these principles are standard; however, because habitability information has some unique and complex features, additional principles for communicating them and making them easy for people to use will be included.

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PRINCIPLES

Chapter 9

Make Information Easy To Find and People Will Use It

Even if a document has all the information a reader needs and is presented in an easy-to-read style and format, the reader may have trouble finding what he or she is looking for because the overall organization is inconvenient or does not reflect the reader's needs. Thus, good organization is critical to a successful document; the document should also be well indexed so the reader can find specific information quickly and efficiently.

Content: Design Information

A habitability information document should have many kinds of information to meet its reader's needs. The principles governing content are discussed below.

1. Information should be given for only one major facility type per document. Most facilities are composed of one building; some buildings may house a number of facilities. In general, people who are looking for habitability information will search first by facility type. Army facilities are assigned numerical codes according to AR 415-28.

2. Give information for typical exterior and interior spaces. After identifying the kind of facility, a reader is most likely to be looking for information by kind of space within or around the facility. Information should be organized by both interior and exterior space types. For some facilities, typical spaces can be grouped into major categories (Figure 37).

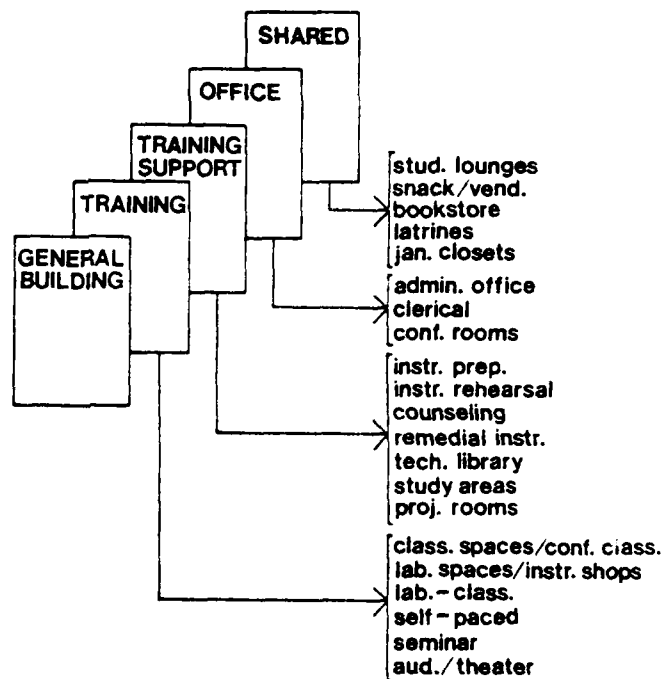


Figure 37. Example of types of space for a facility (schools).

3. Give information on facility subsystems and features. Within a given space type, readers will be looking for the special characteristics of that space or room. Table 1 (Chapter 5) lists characteristics which may be appropriate for each space type.

4. Describe facility users, activities, equipment, and supplies. A major concern of habitability is ensuring that a facility or space effectively supports the activities, people, and equipment that will be in it. Readers of habitability information need to know about typical users, the activities, equipment, and supplies in a facility, or type of spaces. They must also be able to compare the facility (or

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space) they have or need to those described in the design information documents before they can decide which requirement, criteria, or guidance statements they will be able to use. Thus, any assumptions the document writer makes about typical facilities or spaces must be stated.

Usually, assumptions can be stated in three paragraphs or less. More detailed explanation is needed only if it is likely the reader will be unfamiliar with how a typical space works (or should work). Any new technology or equipment which will affect the facility or its design must also be explained in detail (Figure 38).

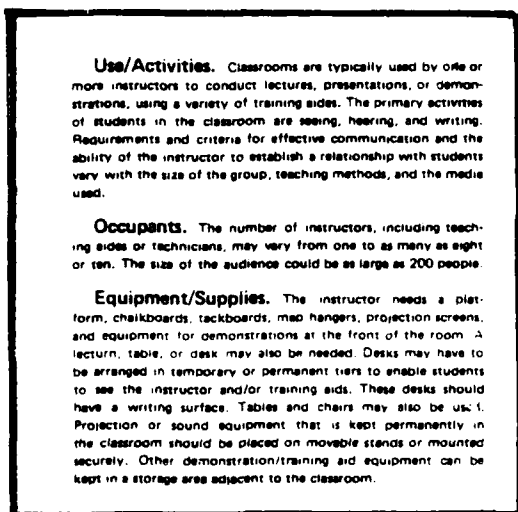


Figure 38. Example of activities, users, and equipment supplies for a space type (classrooms).

Information about the people who will occupy and use a facility or space can include such general information as an organization chart, a list of the number of people in each organizational unit, typical male-female ratios, and demographic descriptions of occupants or occupant groups. At a detailed level, such as for particular types of space, user information can include the number and types of people occupying a room.

Information about facility activities can include general data, such as descriptions of responsibilities and activities of occupying organizational units; typical activities; and charts showing the flow of people, equipment, information, or supplies. For individual spaces, activity information can include descriptions of typical activities or sequences of activities.

General information about equipment or supplies should include descriptions of major equipment and system schematics. For individual spaces, information about quantities and descriptions of equipment typically found or used in the space, technical data about the dimensions or other characteristics of equipment, or quantities and types of supplies stored or processed in a space should be included.

5. Information should be divided into statements of requirements, criteria, and guidance. Because there are a number of different users for habitability information, clear distinctions should be made between what is needed, how those needs are satisfied (or the standards for satisfying them), and guidance for implementing standards. These distinctions result in three categories of design information--requirements, criteria, and guidance (see Chapter 2 and Figure 39).

6. Give an introduction to orient the document user. The introduction should identify for whom the manual is intended and how it is to be used, and should define special terms. The reader does not need to know how the document was developed, but should be told what kind of facility is covered and the kind of project it applies to, i.e., new construction, renovation, or evaluation of an existing facility.

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REQUIREMENTS:

Classroom space should be sized to support a variety of classes, instruction methods, and classroom activities.

CRITERIA

Twenty-five to 35 square feet are required per student. The lower limit of 25 square feet is applicable to classrooms which require only chairs without note-taking arms. The upper limit of 35 square feet is applicable when there is a continuous need for audio-visual presentations, writing surfaces, and the use of reference materials.

GUIDANCE

A space 30 x 50 feet (1500 square feet) will be large enough for 42 to 60 students (including aisles, a teaching station, coat and book storage), regardless of the classroom's configurations.

Figure 39. Example requirements, criteria, and guidance statements.

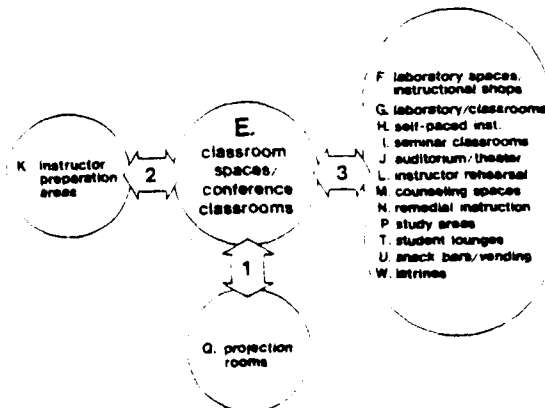
7. Give design principles and policies. Policies of the Army and the Corps of Engineers should be briefly discussed as they relate to the facilities and projects to which the document applies. This discussion should include principles of planning and design for major kinds of space, building subsystems, and characteristics. For example, orientation of a building on a site should include a discussion of functional considerations like traffic flow and parking, building image, and technical considerations like energy conservation. Designing for certain characteristics can be discussed in detail. For example, providing adequate thermal conditions, lighting conditions, sound control, and other characteristics can be covered in depth and referenced at other points in the document.

8. Give key relationship information. The relationship of the facility to other facilities near it should be described. Relationships among spaces within the facility should be characterized. Principles and guidance for basic massing and building layout should be included (Figure 40a and Figure 40b).

RELATIONSHIPS FOR CHAPEL SPACES

- 1 ADJACENT
- 2 NEAR TWENTY-FIVE
- 3 NEAR SEVENTY-FIVE
- 4 ISOLATED
- 5 UNRELATED

	NARTHES	NAVE	ACTIVITY	CHANCEL	BAPTISTRY	CHOIR SEATING	BRIDES ROOM	CHOIR ROOM	SACRISTY	BLESSED SACRAMENT	RECONCILIATION	CHAPLAIN'S OFFICE	ASSISTANTS AREA	SECRETARY
NARTHES														
NAVE	1													
ACTIVITY	1	1												
CHANCEL	2	1	1											
BAPTISTRY	3	1	1	1										
CHOIR SEATING	3	1	1	1	2									
BRIDES ROOM	2	2	5	3	5	5								
CHOIR ROOM	1	4	5	4	4	2	5							
SACRISTY	1	1	5	1	3	5	5	5						
BLESSED SACRAMENT	2	2	2	2	5	5	4	2						
RECONCILIATION ROOM	3	3	5	3	5	5	5	4	2	1				
CHAPLAIN'S OFFICE	3	3	5	3	5	5	5	4	2	2	2			
ASSISTANTS AREA	4	5	5	5	5	5	5	5	3	3	3	1		
SECRETARY														



1. must be adjacent
2. close okay, but adjacent preferred
3. nearby
4. different building or no significant relationship

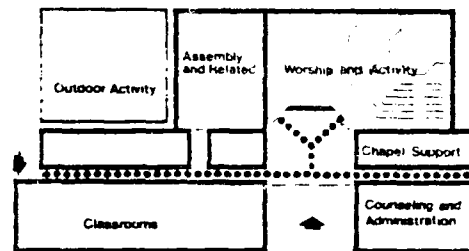
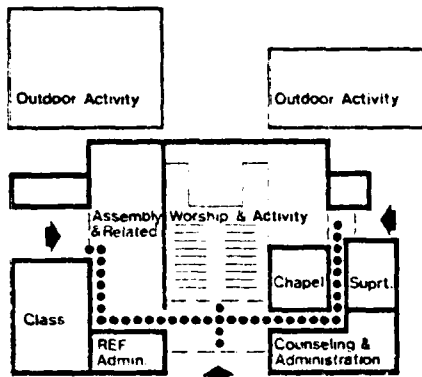
Figure 40. Examples of (a) matrix and (b) diagrammatic space relationships.

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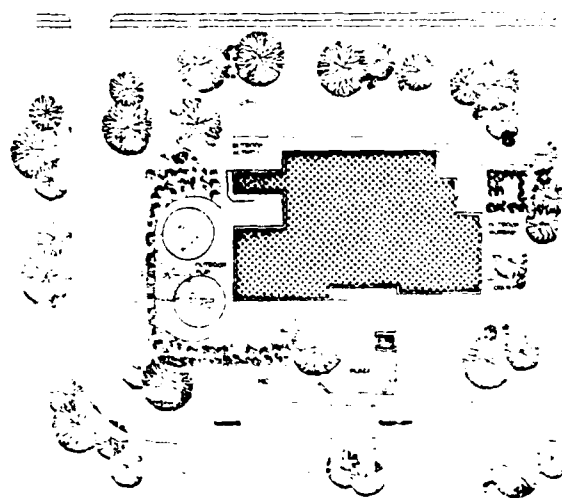
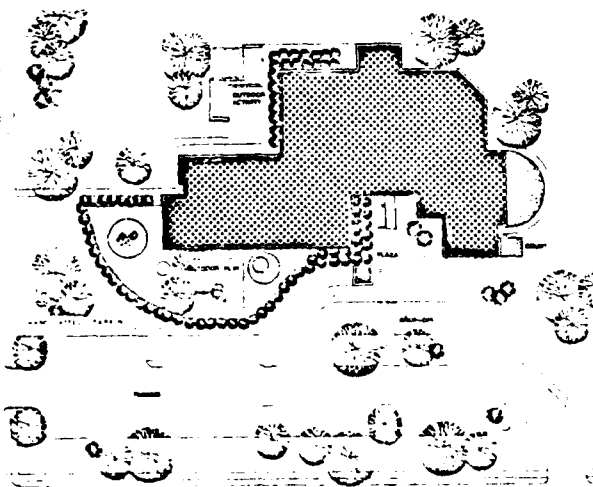
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9. Give sample designs and layouts. Design information should include examples of typical building layouts (to show overall relationships within the building), typical site layouts (to show relationships

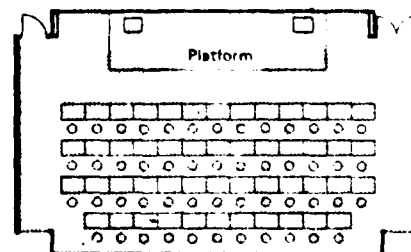
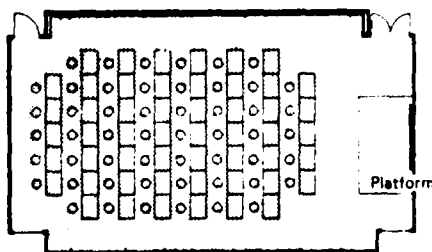
among exterior spaces and to other facilities), and layouts for individual rooms (to show functional relationships within the rooms). See Figure 41.



Sample Religious Facility Designs



Sample Site Layouts



Typical Classroom Layouts

Figure 41. Examples of layout diagrams.

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10. Include an index of terms.

The document should have an index of terms so the reader can locate information by topic. (A table of contents is not usually detailed enough to help readers find specific information.)

11. Give a list of references.

All references cited in the document should be listed. A key to references should be given on each page where they are cited.

Content: Methods

Although habitability information gives helpful reference material, it does not explain how to use it. In many cases, readers will need to know how to use the information in planning, designing, or evaluating facilities. Thus, most habitability information documents should explain:

1. Typical Military Construction--Army (MCA) facility improvement and construction processes

2. Procedures for selecting or comparing potential sites

3. Procedures for evaluating existing facilities to identify improvements or conversion or to set standards for facility management

4. Procedures for evaluating alternative solutions during renovation planning

5. Guidelines for dealing with high technology or new kinds of space, including new kinds of operations and activities, and basic design procedures for new kinds of equipment

6. Procedures for managing existing facilities and space, and for assessing and managing facility problems and implementing improvements.

Organization

Habitability information must be presented in an orderly manner so the reader can quickly find what he or she is looking for. Material should be organized to reflect the way in which tasks are completed.

1. Content should be organized so the reader goes from the general to the specific. Whether dealing with the overall presentation of design information, or presentation of material within a specific section or paragraph, the reader should be given a general picture first. Then specifics can be used to elaborate on the general statements (Figure 42).

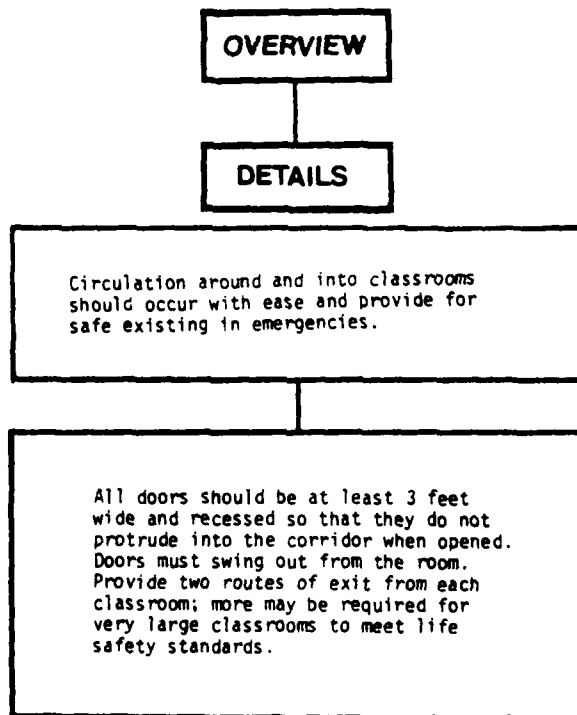


Figure 42. Example of general and detailed design data.

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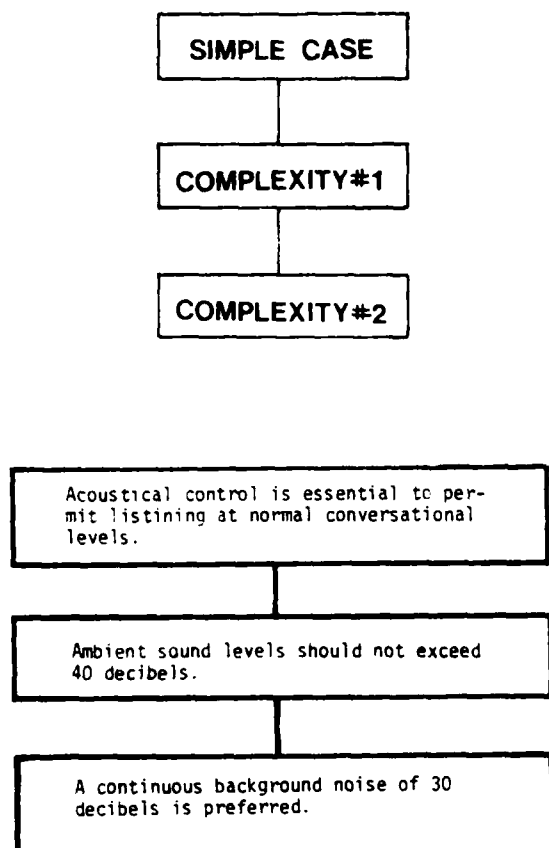


Figure 45. Example of simple and complex information.

5. Logically group information. Logically group information by scale, major categories of space, building subsystems and features, by kind of reader, and by tasks readers are to perform.

Organizing Methods and Instructions

When readers are being told what to do or how to proceed, the following may apply:

1. Present methods in a logical order. Readers must understand the order in which tasks are to be done. Follow the overall task sequence when explaining methods and giving instructions. If recommended methods are given in a separate chapter or section, begin each method description by identifying the task or situation it refers to (Figure 46).

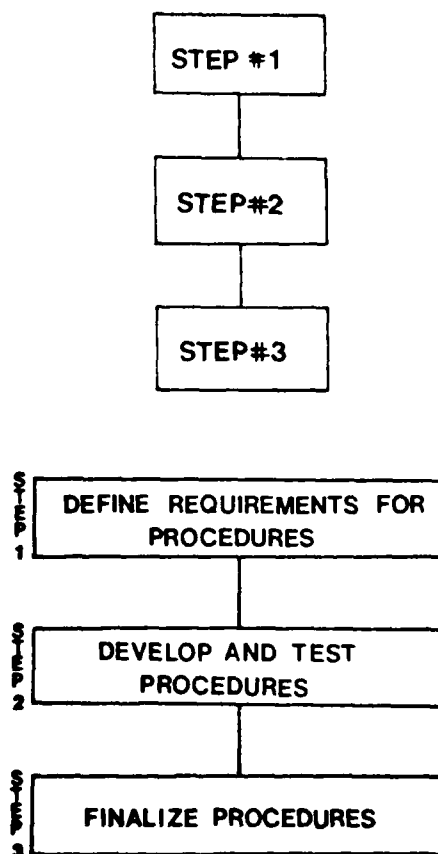
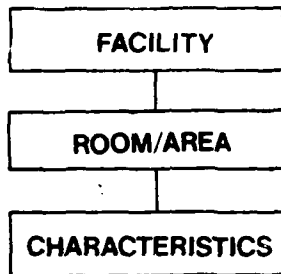


Figure 46. Example showing tasks placed in order.

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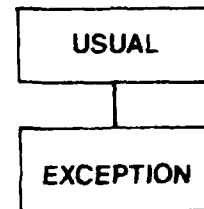


5-1 DESIGN GUIDELINES

- a. Accommodations for the Handicapped
- b. Security Considerations
- c. General Building
 - (1) Space (size)
 - (2) Access/circulation
 - (3) Utilities and waste
 - (4) Environmental conditions
 - (a) Lighting
 - (b) Windows
 - (c) Sound
 - (d) Thermal
 - (5) Appearance/finishes/image
 - (6) Communication
 - (7) Storage
 - (8) Special features
 - (9) Furniture
- d. Classroom Spaces/Conference Classrooms
 - (1) Use/activities
 - (2) Occupants
 - (3) Equipment/Supplies
 - (4) Space
 - (a) Size
 - (b) Shape
 - (5) Access/circulation
 - (a) Location
 - (b) Openings and access
 - (c) Openings and access to divided classrooms
 - (d) Circulation within room
 - (6) Utilities and waste
 - (7) Environmental conditions
 - (a) Lighting
 - (b) Sound
 - (8) Appearance/finishes/image
 - (9) Communication
 - (10) Storage
 - (11) Special feature
 - (12) Furniture
- e. Laboratory Spaces/Instructional Shops
 - (1) Use/activities
 - (2) Occupants
 - (3) Equipment/supplies
 - (4) Space
 - (a) Size
 - (b) Shape
 - (5) Access/circulation
 - (a) Location
 - (b) Openings and access
 - (c) Circulation within room
 - (6) Environmental conditions (thermal)
 - (7) Appearance/finishes/image
 - (8) Special features
 - (9) Furniture

Figure 43. Outline of design information subset from facility to space type and characteristics.

2. Content should be organized from large to small scale. Information about an entire facility should be presented first, followed by information about major portions of the facility, about individual kinds of space within major categories, and information about space characteristics (Figure 43).



All doors should be at least 3 feet wide and recessed so that they do not protrude into the corridor when opened.

Laboratories/shops which use vehicles or large equipment (i.e., that will not fit through a 3 or 6 foot wide doorway) should have an overhead or track-mounted door which allows direct entry to a shop from the outside.

Figure 44. Example of usual and exception statements.

3. State the usual, then the exception. Give the reader a basic understanding by describing the normal or typical case first. Then describe special cases and exceptions to that norm (Figure 44).

4. Go from the simple to the complex. Explain the basics before describing complexities and special applications (Figure 45).

PRINCIPLES

Chapter 9

2. Keep methods separate from substantive information. Readers must be able to distinguish easily between actions (what they should do) and substantive reference material used in planning or design (what they should do something about). Usually it is better to create a separate chapter or section for a method (or to do an outline) so the method is visually separated from habitability information used in that activity (Figure 47).

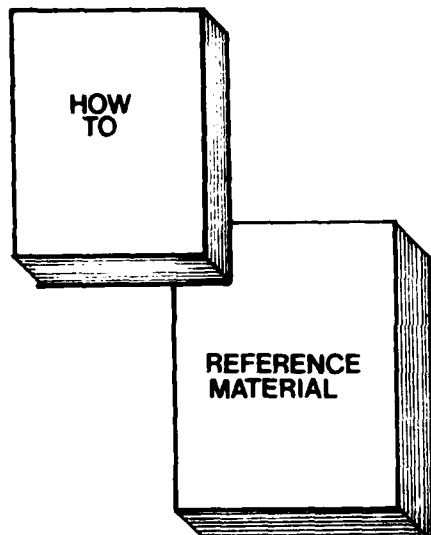


Figure 47. Methods should be separated from referenced design.

3. Clearly identify who must do each task. It is a good idea to begin an instructional chapter or section with a statement or paragraph identifying who is responsible for doing the action being described. If a task sequence involves a number of different performers, responsibilities for each task in this sequence must be clearly identified (Figure 48).

Organizing Design Information

Requirement statements should be presented first, followed by criteria and guidance statements. A requirement must have a corresponding criterion or guidance statement, or both. Requirements tell the reader what is needed or what is to be done. Criteria give the rules or

WHO			TASKS
●	●		1. _____ _____ _____.
	●		2. _____ _____ _____.
		●	3. _____ _____ _____.

Figure 48. Schematic of a task outline that identifies who is to perform tasks.

standards for achieving requirements. Guidance helps the reader apply criteria or meet requirements when standards do not exist. This sequential order for the three kinds of design information should be followed regardless of whether information is general for a facility or is being presented for a specific space (Figure 49).

Example

Figure 50 outlines a typical habitability information document. It shows how some of the organization principles given above can be applied. (Also see the format discussion, p 69.)

PRINCIPLES

Chapter 9

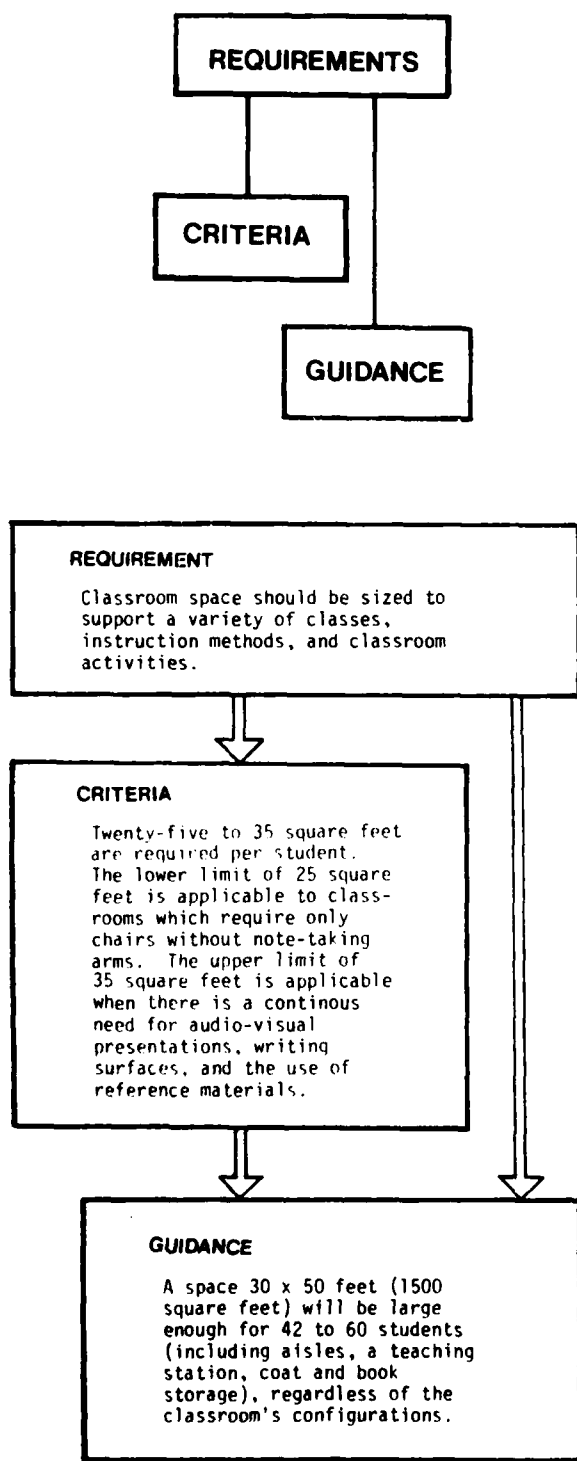


Figure 49. Example showing that each requirement must have criteria and/or guidance statements.

Style

A number of books are available on general writing and technical writing which explain in detail the principles of style (see references, p 94). Some of those principles are:

Clarity.

1. Write to be understood. The adage, "What I said is not what you heard me say" is also true for documents. Making sure the reader understands is of primary importance. Rather than writing to be understood, some writers prefer to write to avoid being misunderstood (Figure 51).

2. Avoid jargon, fancy, and needless words. Writing in plain English means avoiding words which the reader is not familiar with, using simple words rather than elaborate ones with the same meaning, and eliminating unnecessary words and words which do not add to the basic idea or meaning of a sentence (Figure 52).

3. Use specific, concrete language. Avoid vague words and qualifiers (Figure 53).

4. Use the active voice; avoid the passive. (Figure 54).

5. Define acronyms, abbreviations, and technical words which may not be familiar to the reader. It is a good idea to develop a glossary of terms and abbreviations for each document.

PRINCIPLES

Chapter 9

1. <u>INTRODUCTION.</u>	
Purpose of Document	
What Document Includes and Excludes	Description of Facility Users, Uses, and Contents (Equipment, Material, Supplies)
Scope - What Projects the Design Information Applies to	Site Layout Information
Who is User(s)	General Design Information for This Kind of Facility
How to Use (Explains Organization, Format, Applications)	General Design Information for Typical Subsystems
Explanation of Key Terms	
2. <u>PROCEDURES.</u> Variable depends on the purpose of the document and its anticipated users.	4. <u>DETAIL DESIGN INFORMATION</u>
MCA and New Construction Process	Major Category of Spaces
Renovation Procedures	Typical Design Information for this Category
Design Procedures	Specific Space Type
Space Management Methods	Users, Uses, and Contents
Procurement of Furnishings and Equipment	Subsystems and Characteristics (Blocks of Requirements, Criteria, and Guidance Statements)
Site Selection and Orientation	(Repeat for All Space Types Within this Major Category)
Evaluating Alternative Facilities or Designs	(Repeat As Needed for Each Major Category of Spaces)
Preparing Functional Requirements for Design or Improvement Projects	5. <u>GLOSSARY OF TERMS AND ABBREVIATIONS.</u>
3. <u>GENERAL DESIGN INFORMATION.</u> (For a particular facility)	6. <u>REFERENCES</u>
General Goals and Policies for a Facility and Its Design	7. <u>APPENDICES (Typical Forms and Other Special Materials).</u>
	8. <u>INDEX OF TERMS.</u>

Figure 50. Outline for a typical habitability design information document.

"Cut parts into ten foot long pieces."
Does this mean ...
ten foot-long pieces?
or
ten-foot-long pieces?

Figure 51. Example of a difficult-to-understand instruction.

PRINCIPLES

Chapter 9

Original

All features of the building relative to the interior design will be developed as an overall scheme.

Improved

An overall scheme should control all interior design features.

Original

Signing and marking are directly related to the design of the road and are features of traffic control and operation which the designer must consider in geometric layout of the work.

Improved

Designers must consider signs and markings in laying out roads to control traffic and operations

Improved

To control traffic and operations, designers must consider signs and markings in laying out roads.

Original

Where possible, a desirable layout of parking lots and walkways should avoid locations directly over underground utilities.

Improved

In laying out parking lots and walkways avoid locations directly over underground utilities.

Original

Designers should solicit any recommendations that users wish to make and should assure them that such recommendations will be given their careful consideration.

Improved

Designers should get user suggestions and consider them carefully.

Original

In defining space needs, users should refer to their ALO, REDCON or appropriate AR, as well as their TOE or MTOE.

Improved

Space needs should be based on user missions and authorized personnel and equipment lists.

Figure 52. Examples of confusing sentences and improvement for them.

Phrase

Subsequent to
A variety of
In a few instances

Substitute

After
Many
Occasionally

Figure 53. Example of single words that can replace phrases.

Passive

Design information is often used by designers in creating office interiors.

Active

Designers often use design information in creating office interiors.

Passive

A dark appearance is created on some surfaces by sodium lighting.

Active

Sodium lighting creates a dark appearance for some surfaces.

Figure 54. Active and passive voice compared.

6. Make sure words are relevant and useful, not obvious or redundant. Relevant words add to the purpose of the chapter, section, paragraph, or sentence; useful words help the reader act on the information he or she reads. Obvious words or phrases are empty generalities or information which do not add to ideas presented elsewhere. They should be edited from the text as should repetitious material or phrases. Many times redundancy can be eliminated by good organization and effective use of paragraph headings.

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Chapter 9

Simplicity

1. Present only essential facts. Make sure material is accurate and current. Avoid opinions, biases, and guesses. Cite references.

2. Do not overexplain. Too much explanation can confuse the reader. It can also make the reader lose interest.

3. Use short words. Use one- or two-syllable words in place of longer words, where possible. It is best to average 1 1/2 syllables per word (Figure 55).

<u>Long Word</u>	<u>Short Word</u>
Demonstrate	Show
Appearance	Looks, Image
Illumination	Lighting

Figure 55. Long and short words compared.

4. Keep sentences short. A good sentence length is 12 to 14 words. Sentences with more than 17 words are usually too long (Figure 56).

<u>Original</u>
There are a number of designers by whom criteria for safety are considered important.
<u>Improved</u>
Many designers consider safety criteria important.

Figure 56. Example of a long sentence that was shortened.

5. Avoid coding. When codes, such as numbers, acronyms, etc., are used in text, the readers may not remember what they stand for. Unless a reader is thoroughly familiar with the coding, codes will make the text confusing. In a reference document (like ones containing habitability information), the reader will not be reading from the front cover. The reader will have to find the definitions in order to understand codes. See Figure 57.

Original

Resolve A and X relationships first, followed by B, C, and D relationships.

Improved

Resolve inflexible space relationships like "must be next to" (A) or "must be distant" (X), first. Then, work out remaining relationships, "adjacency desired" (B), "not more than 100 feet distant" (C), and "not more than 200 feet distant" (D).

Figure 57. Example of coding.

6. Keep the reading level low. Use a grade-level index to measure the reading level of the document text (see Figures 58a and 58b).

PRINCIPLES

Chapter 9

FORCAST READING DIFFICULTY LEVEL*

The FORCAST Reading Difficulty Level Formula should be used as a quality control check. It will help to keep one's writing at the level of the person who will be reading a manual.

The reading difficulty level should be checked frequently during the writing of a manual. Do not wait until the draft copy is completed.

An important thing to remember when using the FORCAST formula for a quality control check is to not write to the formula. Writing should be directed to the user of the manual, not the formula. The formula serves as a guide for the reading difficulty level of material after it is written.

STEP 1.

Select a 150 word passage from a completed section. Do not use the formula to check sentences or incomplete paragraphs. It is best to start counting words for a passage at the beginning of a paragraph or section.

Counting the Words

Words include numbers, letters, symbols, and groups of letters that are surrounded by white spaces. Hyphenated words and contractions are counted as one word. As an example, each of the following is counted as one word: "couldn't", "F.O.B.", "i.e.", "\$32,008", "second-grade".

STEP 2.

Count the number of one syllable words in the 150 word paragraph.

Example: 79

Counting the Syllables

Count syllables the way the word is pronounced: such as "row" has one syllable, "mention" has two. With symbols and figures the syllables are known by the way they are normally read aloud, such as, one syllable for "cents", three for R.F.D. ("are-oh-dee"), and four for 1918 ("nineteen-eighteen"). When in doubt about syllables, consult a dictionary.

STEP 3

Divide the number of one syllable words by 10.

Example: $79/10 = 7.9$

STEP 4

Subtract the result from 20 to obtain the READING GRADE LEVEL.

Example: $(20 - 7.9) = 12.1$

READING GRADE LEVEL = 12.1

* Guidebook for the Development of Army Training Literature. U.S. Army Institute, November 1975.

a. FORCAST reading difficulty level.

FOG INDEX

(developed by Robert Gunning)

The FOG INDEX indicates the minimum grade level a reader needs to comprehend a section of written material. The lower the index, the better. A score of 11 to 12 should not be exceeded in most cases.

STEP 1

Select a passage about 100 words long. Include complete sentences.

STEP 2

Count the number of sentences.

Example: 8

STEP 3

Compute the average number of words in each sentence by dividing the number of words in the passage by the number of sentences.

Example: $116/8 = 14.5$

STEP 4

Count the words with more than two syllables.

Example: 22

STEP 5

Add the average number of words per sentence and the number of words with more than two syllables.

Example: $14.5 + 22 = 36.5$

STEP 6

Multiply the total by 0.4 to find the FOG INDEX.

Example: $36.5 \times 0.4 = 14.6$

b. FOG INDEX.

Figure 58. Two indices for reading level.

PRINCIPLES

Chapter 9

Writing Instructions

1. Use the imperative voice for instructional statements. See Figure 59.

Original

After excluding after-hour conferences and conferences held in private or in previously assigned special spaces for individual units, the total in each size category is divided by 40 to establish the number of shared conference rooms required.

Imperative

From the previous total for a size category, subtract after-hour and private conferences. Make sure conferences held in other spaces are not included. Then, divide the remainder by 40 to find the number of shared conference rooms needed.

Figure 59. Example of the imperative voice for instructions.

2. Make sure different actions are distinguished from each other. Explain only one instruction at a time; readers may be confused if different instructions are strung together in a single sentence or paragraph. See Figure 60.

Original

After excluding after-hour conferences and conferences held in private or in previously assigned special spaces for individual units, the total in each size category is divided by 40 to establish the number of shared conference rooms required.

Step-by-Step

Step 3. Subtract after-hour and private conferences from the total of all conferences.

Step 4. Check to ensure that conferences held in other spaces have not been included. If they have, subtract them from the total also.

Step 5. Divide the remainder in Step 4 by 40 to find the number of shared conference rooms needed.

Figure 60. An example showing how tasks can be labeled for distinction.

3. Use performance-oriented rather than topic-oriented style. In topic-oriented style, material is presented as a string of subjects or topics. In performance-oriented style, instructions are grouped in a logical task sequence. See Figure 61.

TOPIC-ORIENTED WRITING

Topic-oriented writing places heavy demands on the reading, studying, and conceptualizing skills of the reader.

Topic-oriented writing focuses on the generalizations and concepts which constitute a body of knowledge--it tells "about" a subject area rather than telling what to do or "how to do it".

Topic-oriented manuals do not identify a particular user audience. A topic-oriented manual is frequently described as a general reference text, intended for anyone in a general audience group.

Topic-oriented writing does not identify subject-related duties and tasks, who might be expected to perform them, or how any given user might perform them. The description of the "body of knowledge" may carry implications for duty and task performance for any reader. However, it is left up to the reader to deduce from the description what duties and tasks should be performed, how they are to be performed, and who should perform them.

PERFORMANCE-ORIENTED WRITING

Performance-oriented writing focuses on the duties and tasks a reader is expected to perform and the information needed in order to perform such duties and tasks--it tells the reader "what to do" and where possible, "how to do it".

Performance-oriented manuals identify a particular reader audience. To write performance-oriented literature one must start by identifying who is expected to be the primary reader and the subject-related duties and tasks the reader will perform. The writer must then translate knowledge of the subject area into the information and directions the reader will need to learn and perform the duties and tasks identified.

In performance-oriented writing, information is selected from the "body of knowledge" and organized to place major emphasis upon its application to duty and task performance. It "talks" directly to the reader, the duties and tasks he is expected to perform, and how he can perform them. As a result, performance-oriented literature has greater relevance to a job training or job performance setting than topic-oriented literature. The reader does not have to strain the information he needs out of the general pot of knowledge and then wrestle with the "what should I do about it" question.

Figure 61. A comparison of topic-oriented and performance-oriented writing.

PRINCIPLES

Chapter 9

4. Give reasons for the instruction. Reasons can be given in many ways. They can take the form of objectives or explanations. They can also describe the consequences for not following the instructions. Giving reasons helps motivate the reader to obey an instruction and to understand how important it is. See Figure 62.

STEP 5	
OBJECTIVE	To begin to prepare final documentation of facility requirements
RATIONALE	Requirements need to be well organized for the designer or they will be ignored or of little use.

Figure 62. Two ways to state reasons.

5. Explain how to complete instructions. Include helpful hints and suggestions for doing the action each instruction describes. See Figure 63.

ACTIONS	
4. PLAN ACTIVITIES AND SCHEDULE	
A. Prepare calendar (Form 1, see Appendix A)	
B. Schedule meeting rooms and A-V equipment	
SUGGESTIONS	
Action 4	It is important that each step and meeting be plotted on a calendar so that adequate time is provided to complete the Detailed Functional Requirements by the date it must be submitted. It would also be advisable to block in a period of time to allow for unforeseen events impacting the completion of the process.

Figure 63. Example showing the difference between tasks and instructions for completing them.

6. Clearly identify who is responsible for each action or instruction. If all actions in a sequence are to be done by the same person or group, define responsibilities before the sequence. If different actions in a sequence are done by different persons, name the responsible individual(s) immediately after the action or instruction statement (or use a chart to show responsibilities). See Figure 64.

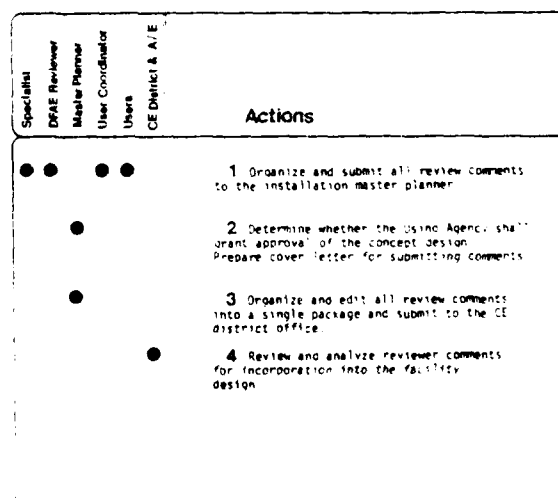


Figure 64. A sample chart identifying tasks and who must do them.

7. Keep tasks in a logical order. Comprehension is reduced if readers must put tasks in a proper sequence at the same time they are trying to understand the task requirement.

PRINCIPLES

Chapter 9

Format

Habitability information documents generally serve as a reference for people performing some task to improve or develop a facility. To be effective, and to ensure that the information it contains is actually used, the reader must find it convenient to use.

Making Information Easy To Find

1. Use standard page layouts. If pages are organized in a standard way, readers can anticipate where to find information once they become familiar with the page organization.

2. Chapter and section titles should be shown on each page. A running head can be used effectively to display the chapter title and number on each page as well as the section name and identifier. Placing that information away from the bound edge of a page allows the reader to identify the page content without opening the page completely. (Figure 65).

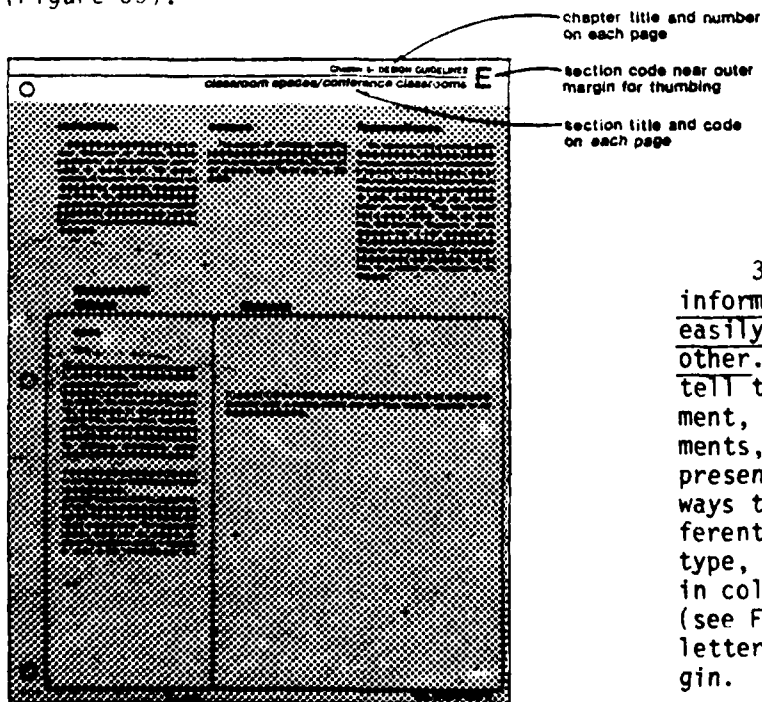


Figure 65. Example of a running head.

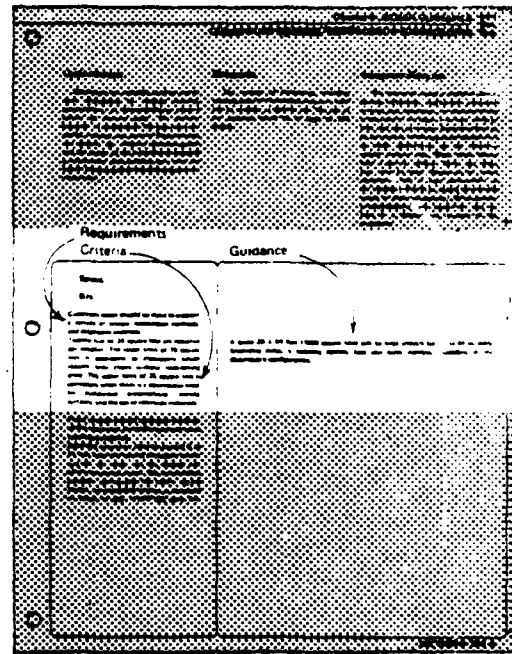


Figure 66. Requirements, criteria, and guidance statements must be distinguished from each other.

3. The three types of design information statements must be easily distinguished from each other. The reader should be able to tell the difference among requirement, criteria, or guidance statements, even though they are normally presented as sets. There are three ways to do this: (a) use a different type style for each statement type, (b) list each statement type in columns in a horizontal grouping (see Figure 66), (c) place bold letter codes (R, C, G) in the margin.

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PRINCIPLES

Chapter 9

4. Visually group related information. Information which is related should be organized into visual blocks so that the relationships are seen. Put spaces above and below the block so that there is a visual separation from other blocks of information. Other graphical techniques such as outlines or shading could be used to identify these blocks. (See Figure 67.)

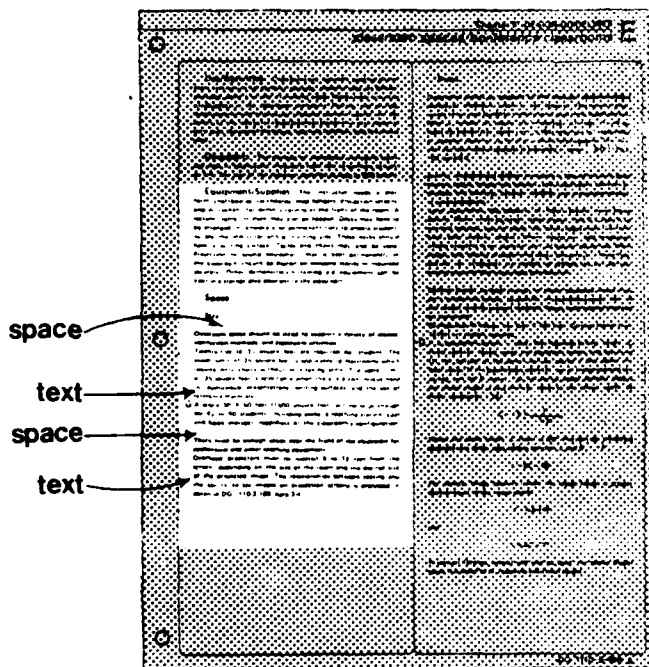
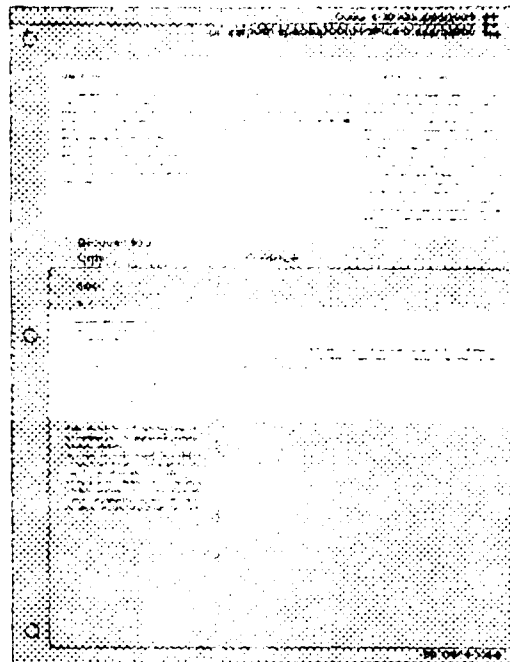


Figure 67. Method for vertically and horizontally grouping information.



5. Topic headings should stand out. Topic headings should not be crowded against the text. The type should be larger and bolder than that used in the text (Figure 68).

Figure 68. Use of bold type for topic headings.

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PRINCIPLES

Chapter 9

Making Material Easy To Read

1. Select a type style that is easy to read. Type style can affect the rate of reading as well as comprehension. Helvetica medium is one style that is pleasant to the eye and efficiently read.

2. Minimize eye movement patterns for the reader. By keeping columns of text material narrow, only one or two eye movements are needed to read a line. Wide columns, such as full-page width, will require four to five eye movements per line. Wide columns also make it difficult for the eye to find the start of the correct new line when returning to a previously read line (Figure 69).

3. Use visual cues to guide eye movements. Put lines outlining material and separating columns on pages with more than one column. This helps guide the reader's horizontal and vertical eye movement patterns (Figure 70).

Making Material Easy To Update

1. Bind the document so it is easy to update. A loose-leaf binding is recommended for habitability information documents. New laws, policies, economic constraints, and other factors require the design information to be updated regularly. Only a few pages may be affected by such a change. Thus, the cost is minimized to keep a document up to date by reprinting only a few pages and inserting them into the docu-

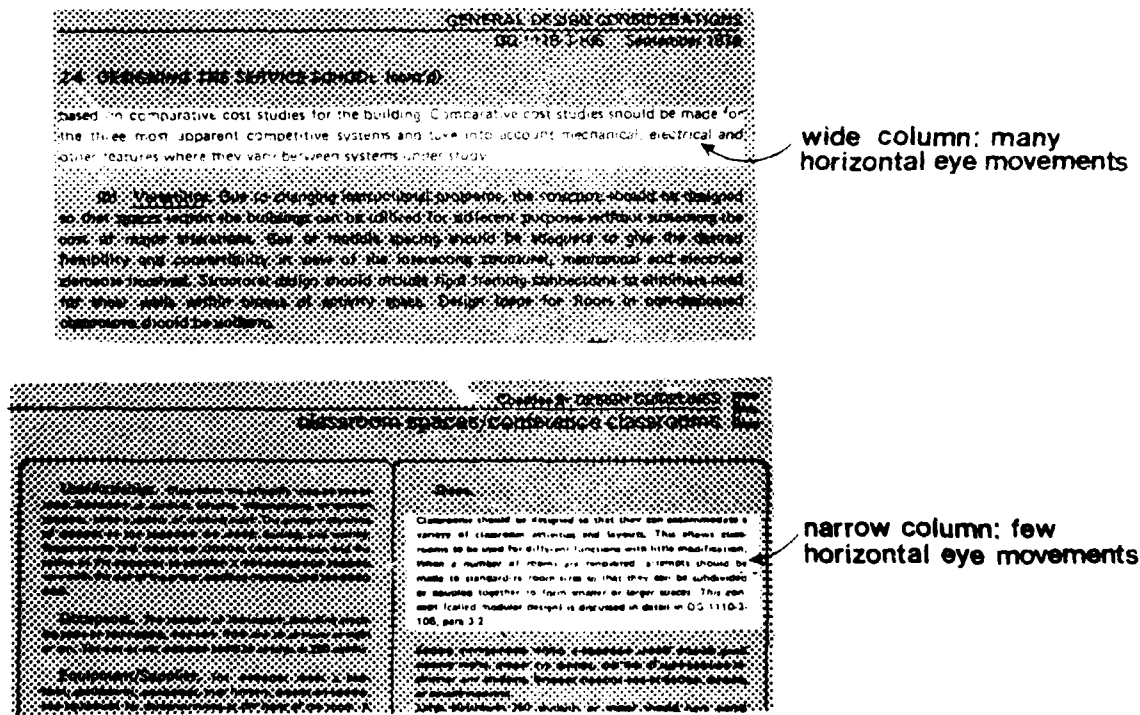


Figure 69. A comparison of single- and double-column pages.

PRINCIPLES

Chapter 9

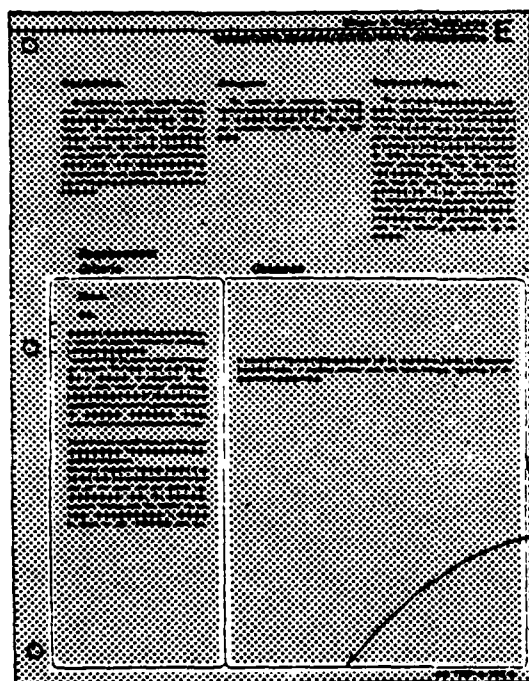


Figure 70. An example of page and column outlines.

ment. An additional advantage for a loose-leaf binder is that readers can insert their own personal notes at appropriate locations in the document (Figure 71).

2. Identify each page. A disadvantage of loose-leaf binding is that pages can be removed. By printing the document number (or a short title) and placing it in a standard location on the page, a reader can readily recognize where a loose page came from. If pages are changed and reprinted and are to replace previous additions of a page, the change identifier can also be printed on the new page (Figure 71).

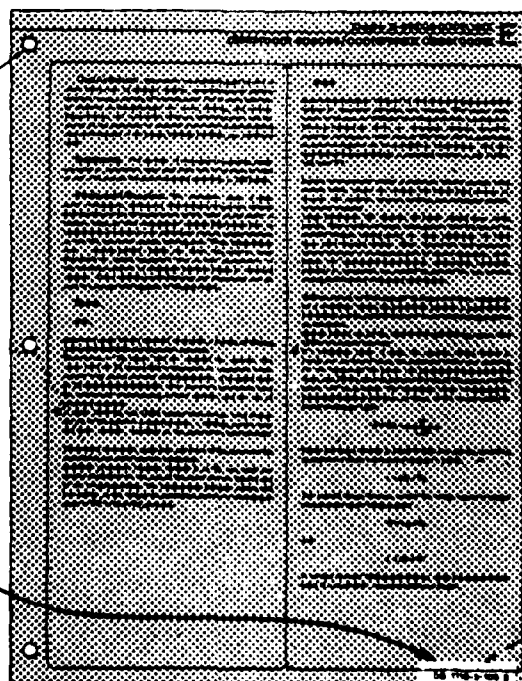
Example 1.6

The format principles above have been incorporated into Figure 72. This figure was developed specifically for habitability information.

binding allows for easy updating and the addition of personal notes

Figure 71. Document numbers should be printed on each page of loose-leaf publications.

document numbers on each page reference the source if a page is removed or copied



PRINCIPLES

Chapter 9

Chapter 5: DESIGN GUIDELINES

classroom spaces/conference classrooms **E**

Use/Activities

Classrooms are typically used by one or more instructors to conduct lectures, presentations, or demonstrations using a variety of training aids. The primary activities of students in the classroom are seeing, hearing, and writing. Requirements and criteria for effective communication and the ability of the instructor to establish a relationship with students vary with the size of the group, teaching methods, and the media used.

Occupants

The number of instructors, including teaching aides or technicians, may vary from one to as many as eight or ten. The size of the audience could be as large as 200 people.

Equipment/Supplies

The instructor needs a platform, chalk boards, tackboards, map hangers, projection screens, and equipment for demonstration at the front of the room. A lectern, table, or desk may also be needed. Desks may have to be arranged in temporary or permanent tiers to enable students to see the instructor and/or training aids. These desks should have a writing surface. Tables and chairs may also be used. Projection or sound equipment that is kept permanent in the classroom should be placed on movable stands or mounted securely. Other demonstration/training aid equipment can be kept in a storage area adjacent to the classroom.

Requirements

Criteria

Space

Size

Classroom space should be sized to support a variety of classes, instruction methods, and classroom activities.

Twenty-five to 35 square feet are required per student. The lower limit of 25 square feet is applicable to classrooms which require only chairs without note-taking aids. The upper limit of 35 square feet is applicable when there is a continuous need for audiovisual presentations, writing surfaces, and the use of reference materials.

There must be enough space near the front of the classroom for audiovisual and other teaching equipment.

Overhead projectors must be located 8 to 15 feet from the screen, depending on the size of the room and the desired size of the projected image. The relationships between seating and the ability to see images on projection screens is discussed in detail in DG 1110-3-106, para 3-4.

Guidance

A space 30 x 50 feet (1500 square feet) will be large enough for 42 to 60 students (including aisles, a teaching station, coat and book storage) regardless of the classroom's configuration.

DG 1110-3-106 S

Figure 72. Comprehensive format example.

PRINCIPLES

Chapter 9

E Chapter 5: DESIGN GUIDELINES classroom spaces/conference classrooms

Requirements

Criteria

Shape.

Classrooms should be designed so that they can accommodate a variety of classroom activities and layouts. This allows classrooms to be used for different functions with little modification.

When a number of rooms are renovated attempts should be made to standardize room sizes so that they can be subdivided or coupled together to form smaller or larger spaces. This concept (called modular design) is discussed in detail in DG 1110-3-106 para 3.2.

Seating arrangements within a classroom should provide good viewing angles, proper eye contact, and line of sight between instructor and students, between students and projection screens, or among students.

Large classrooms (50 students or more) should have tiered seating. Room width-to-length ratios greater than 0.6 should be avoided because seating along the outer edges near the front have poor viewing angles. When interaction and discussion among students is an essential part of course objectives, room shapes and seating arrangements (e.g., semicircular, horseshoe, circular, or octagonal) are needed to achieve the eye contact among students that encourages participation.

Ceilings should be high enough to insure necessary image sizes on a projection screen, to provide all students a good view of the screen, and to prevent students' heads from casting shadows on the screen. Ceilings should not be less than 9 feet high. Ceilings higher than 12 feet are seldom required.

Guidance

If a projection screen is used, the required ceiling height, C (feet), can be found using the equations below and assuming (1) the bottom of the screen will be placed 4 feet above the floor, and (2) the distance between the top of the screen and the ceiling will be 6 inches. For horizontal image formats (where the image height is less than or equal to the screen width, W (feet)), divided by 1.33:

$$C = 4.5 + \frac{W}{1.33}$$

Where the room length, L (feet) is $6W$; this can be amplified to establish a direct relationship between L and C :

$$L = 6C - 36$$

For vertical image formats (where the image height is greater than or equal to the image width):

$$C = 4.5 + W$$

and

$$L = 6C - 27$$

If vertical formats (slides) will also be used, the screen height value H is equal to W requiring additional height.

DG 1110-3-106 S

Figure 72. (Cont'd)

Chapter 5: DESIGN GUIDELINES classroom spaces/conference classrooms **E**

Requirements Criteria

Access/Circulation.

Location.

A classroom should be conveniently located and away from noisy areas. The classroom should be separated from spaces that require privacy, but near other training spaces. It is best to centrally locate a frequently used classroom (fig. 5-13).

Openings and Access.

Late students should be able to enter classrooms without disrupting class activity. At least one door should be at the rear of the classroom.

Access to classrooms conducting classified instruction should be controlled.

Circulation around and into classrooms should occur with ease and provide for safe exiting in emergencies.

All doors should be at least 3 feet wide and recessed so that they do not protrude into the corridor when opened. Doors must swing out from the room. Provide two routes of exit from each classroom. more may be required for very large classrooms to meet life safety standards.

Movement of equipment in and out of classrooms should occur with ease.

Classroom doorways should not have thresholds. In classrooms where large furniture or large equipment is used, double doors should be provided or doors should be sized to allow easy movement of equipment.

Guidance

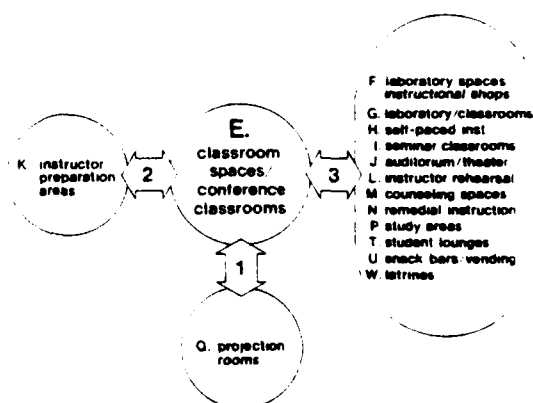


Figure 5-13. Access/Circulation Relationships

See para 5.2(b) for physical security guidance.

DG 1110-3-108 5

Figure 72. (Cont'd)

PRINCIPLES

Chapter 9

Chapter 5: DESIGN GUIDELINES classroom spaces/conference classrooms

Requirements Criteria

Subdivided Classrooms.

Partition systems for subdividing large classrooms should be durable, easy to operate, and minimize sound transmission between subspaces.

Partitions should have a sound transmission classification (STC) of 45 or greater. Seals around all edges (particularly along the floor and ceiling) are essential.

Partitions should be placed so that furnishings and training equipment are available in each subspace and room features and controls are accessible from within each subspace.

Each subspace should have electrical, television, and sound receptacles and controls, chalkboards and other items necessary to meet training needs. Partitions should be positioned between windows and lighting fixtures.

Exits from a subspace must provide safe emergency egress and not disturb other subspaces.

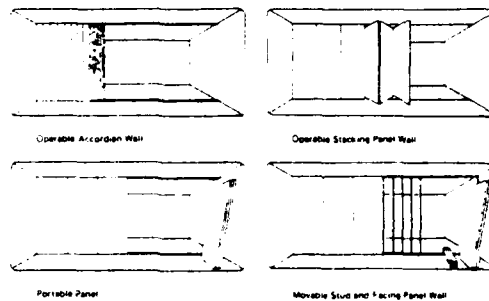
Each subspace must have an independent exit which opens directly into a corridor and does not pass through other subspaces. Most life safety standards consider operable walls, accordion-fold partitions, or a door in a partition between subspaces a second route of exit.

Circulation Within Room.

Furniture and training aids should be arranged to provide good visual contact between the instructor and students, to allow students to see images on projection screens easily, and to permit safe exiting in emergencies.

Windows should be located along the sides of rooms so that neither students nor instructors are required to look into the glare of window light. Seats for students should not be closer than 2W nor farther than 6W from a projection or television screen of width W. Aisle widths and locations and the number of seats which can be placed together between aisles must comply with life safety standards.

Guidance



PARTITION TYPE	Relative Cost	CHANGE FREQUENCY			
		Hourly	Daily	Monthly	Yearly
Fixed (non-load bearing) 6' CMU 5' GWS	1	No	No	No	Yes
Movable	1.8	No	No	Possible	Yes
Accordion	2.6	Yes	Yes	Yes	Yes
Portable	3.2	No	Possible	Yes	Yes
Folding Panel	5.4	Yes	Yes	Yes	Yes

Figure 5-15 Changeable wall system

DG 1110-3-106 S

Figure 72. (Cont'd)

PRINCIPLES

Chapter 9

Chapter 5: DESIGN GUIDELINES

classroom spaces/conference classrooms

E

Requirements Criteria

Guidance

Utilities and Waste.

There should be enough wiring to support all equipment used in classroom presentations or demonstrations, or for anticipated future use.

Electrical service will provide 115 volt, ac, single-phase power and special power supplies (as needed). Power and communication and electronic cables should be inclosed to minimize the need to string cables across the floor. Receptacles and jacks should be provided in sufficient quantities at convenient locations in each classroom.

Controls for lighting, audiovisual equipment, and sound systems should be located where the instructor can easily reach them.

Environmental Conditions.

Lighting.

Various lighting levels are needed to meet lighting requirements for any type of instruction.

For classroom reading tasks, 70 foot-candles is usually adequate. For viewing projection screens, room ambient light level should be between 10 and 33 percent of the screen (or tube) brightness. For particular media the following are recommended:

16-mm movies	5 to 10 foot-candles
35-mm slides	15 to 25 foot-candles
Television monitors	35 foot-candles
Television projection screen	4 to 10 foot-candles

Luminaires should be selected to prevent direct or reflected glare problems (see DG 1110-3-106, para 3-4b).

Daylight entering the room through windows must be controlled to minimize shadows and glare.

Seating should be arranged so window light is on the students' left; this will keep hand shadows from falling on writing areas used by right-handed people (usually the majority). Venetian blinds or shades can control shadow and glare problems at times when it is bright outdoors.

The preferred location for controls is at the front of the room where the instructor stands. In classrooms where a lectern is almost always used, a control panel built into the lectern may be desirable. Lighting controls provided for the convenience of the instructor may be redundant to controls normally located near exits. However, dimming controls need only be included for the instructor.

DG 1110-3-106 S

Figure 72. (Cont'd)

PRINCIPLES

Chapter 9

E Chapter 5: DESIGN GUIDELINES classroom spaces/conference classrooms

Requirements

Criteria

Classroom lighting should be dimmable and controls should be convenient to the instructor.

Fluorescent lighting should be circuited for one-half and full intensity. Incandescent lights should be circuited through dimmers for infinite light intensities of zero to full lamp wattage. However, to simplify the use of the system, dimmers can be preset and locked at two or three intensities, then controlled by simple toggle switches. Lighting controls should be located with audiovisual equipment controls at the front of the room. Window shades or blinds should seal out daylight well enough to achieve the appropriate light level.

Only occupied areas of a classroom need to be lighted.

Light switches should control zones of a classroom. It is better to establish zones that extend across the room than zones which run the length of the room.

There should be sufficient task lighting. Adjustable track or eyeball (spot/flood) lighting should be used to illuminate the instructor, classroom demonstrations, chalkboards, and other training aids.

Sound

The instructor should be easily heard. Undesirable sounds generated inside the room should not be distracting.

A portion of the classroom ceiling should be dropped and contoured at the angle to which sound will be projected most efficiently.

Sounds generated outside a classroom should not be allowed to disturb activities in the classroom; sounds generated in one classroom should not disturb other classrooms.

Walls between instruction spaces should have an STC of 45, spaces between instruction spaces and corridors should have an STC of 40. Placing seals on classroom doors and windows can effectively reduce sound leakage. Thick glass in windows will also reduce sound transmission.

Guidance

Proper placement and a correct amount of sound absorbing surfaces (acoustical tile, carpeting) can produce desirable conditions in a classroom. Too little absorption (a lot of hard surfaces) will result in echoes, make hearing at certain locations difficult, and allow distracting sounds to carry throughout the room. Too much or improperly placed absorption materials will reduce the instructor's voice range. On tiers for seating and on steps, particularly when voids exist below them, sound generation caused by the impact of feet on a hard surface can be eliminated or reduced by carpeting. Transmission of such sounds can be reduced by placing carpet or absorption materials on lower walls and riser or on the undersides of tiers and steps.

Noise with a wide frequency spectrum and no distinguishable tones (white noise) is produced by the flow of air through diffusers and is effective in masking many noises which would otherwise be distracting.

DG 1110-3-106 S

Figure 72. (Cont'd)

Chapter 9

classroom spaces/conference classrooms

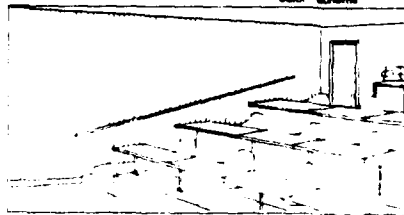
Criteria

Appearance/Finishes/Image

Interior finishes and colors should be selected to maintain acceptable levels of visual comfort (controlled reflectance properties and brightness ratios). Accepted methods of achieving visual comfort include painted ceilings, walls, woodwork, etc., to insure high light reflection, using matte rather than glossy paint, using satin rather than glossy wood finishes, using light-colored furniture and equipment, using light-colored tack and chalkboards, using light-colored floors having a multisource for daylight making windows continuous, placing window needs flush with the ceiling, and using minimum-width window mullions (fig. 5.14).

Guidance

color scheme



general decor recommendations

Acoustic materials should be selected to coordinate with overall design theme. Soundings and finishes should be durable for heavy use.

	Item	recommended characteristics
Interior	Walls	Use light colors. If a paint is recommended to minimize repair, hard surfaces are recommended for easy maintenance.
	Floors	Use recommended decent colors or wood finishes.
	Doors	Use recommended decent colors or wood finishes.
	Trim	Use recommended decent colors or wood finishes.
Exterior	Seating	Chairs should be movable.
	Tables	Tables used by students should have laminated work surfaces and rounded or beveled edges.
	Lighting	Spotlights should be used to accent the speaker and demonstrate areas.
	Curtains	Backdrop shades are recommended. Curtains should coordinate with the overall color scheme.

Figure 5-14 Decor guidelines for classroom spaces/conference classrooms

DG 1110-3-106 S

Figure 72. (Cont'd)

PRINCIPLES

Chapter 9

E Chapter 5: DESIGN GUIDELINES classroom spaces/conference classrooms

Requirements

Criteria

Communication.

Students should be able to hear the instructor and to see what is being written or shown. There should be a sound amplification system in large training spaces. Television should also be used to illustrate fine points of complex experiments (e.g., materials seen through a microscope). Recommendations for the installation of receptacles and cables are given in para 5-2.d(6).

There should be enough television monitors to insure that each student can see the television monitor well.

Television monitors should be placed along classroom walls; there should be one television per 25 to 35 students. Mounting of monitors on permanent fixtures is preferred for security.

The instructor should have a control console for all electrical equipment in the room.

Controls may be mounted in a special cabinet in the front of the room, mounted on the wall, or located in a lectern. Also see para 5-2.d(6).

Storage

Inadequate storage may cause general-purpose classrooms to be "dedicated" because they must be locked to protect equipment (see DG 1110-3-106, para 2-4c). When equipment is used frequently in one classroom, secure storage space should be provided within the room.

Special Features

Movable walls and collapsible curtains should be available so administrators can vary classroom size.

Guidance

The size of the audiovisual storage space can be determined from the following media/storage volume (units per cubic foot) guidelines (also see DG 1110-3-106 3-4b):

16-mm film (400-foot reels)/9 reels
Film strip/160 strips
8-mm film loops/45 loops
35-mm slides/535 slides
Audio cassettes/143 cassettes

7-inch reel audio tape/42 reels
Long playing records/40 records
Overhead projection transparencies/64
Microfilm (35-mm)/34 films
Microfilm (16-mm)/68 films
Microfiche/1,785 cards

See figure 5-15

DG 1110-3-106 S

Figure 72. (Cont'd)

PRINCIPLES

Chapter 9

Chapter 5: DESIGN GUIDELINES

classroom spaces/conference classrooms **E**

Requirements

Criteria

Furniture

Seating should be reasonably comfortable, but not so relaxing that it encourages inattentiveness (see DG 1110-3-106, para 3-3e).

Chairs with contoured seats and backs are more comfortable than those with straight seats and backs. The contours also keep the user facing forward because the contours cause discomfort when the user is oriented in other directions (fig 5-16).

Furnishings for a classroom should be selected to meet the needs of the courses which use the classroom.

Guidance

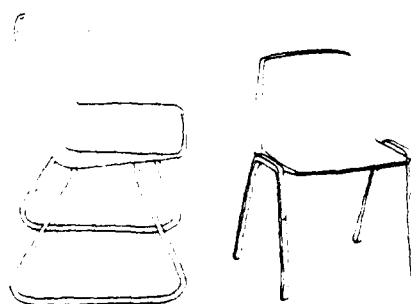


Figure 5-16 Examples of plastic shell chairs

The number of chairs, tables, or desks depends on the desired class size. The instructor's need to write material for students to see may be satisfied by a variety of products, including chalkboards, flip charts, boards that use marker pens instead of chalk, electronic chalkboards, and overhead projectors with films that can be written on with wax pencil or special markers. The instructor's need to display papers and other visual aids may be satisfied by tack boards, tack strips along the top border of chalkboards, magnetic chalkboards, and a variety of special devices for hanging papers, maps, and charts. Some of these furnishings may be free standing and movable, while others may be fixed to walls or hung from ceilings (fig 5-17).

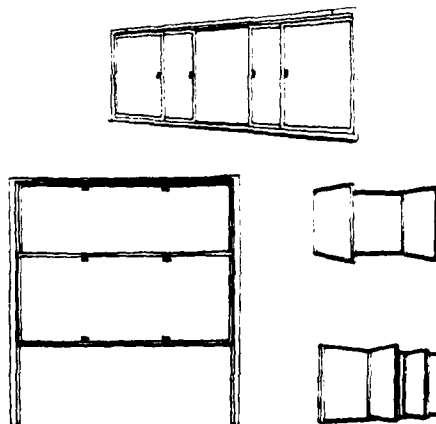


Figure 5-17 Examples of chalkboards/tackboards

DG 1110-3-106 S

Figure 72. (Cont'd)

PRINCIPLES

Chapter 9

Illustrations

Advantages

It is essential to illustrate habitability information documents. Illustrations save the reader time, increase interest, and motivate. They also help the reader understand and remember concepts and relate the text to reality.

1. Choose illustrations to reinforce or emphasize the text. Use illustrations to reiterate the components of an idea or concept and to highlight relationships (Figure 73).

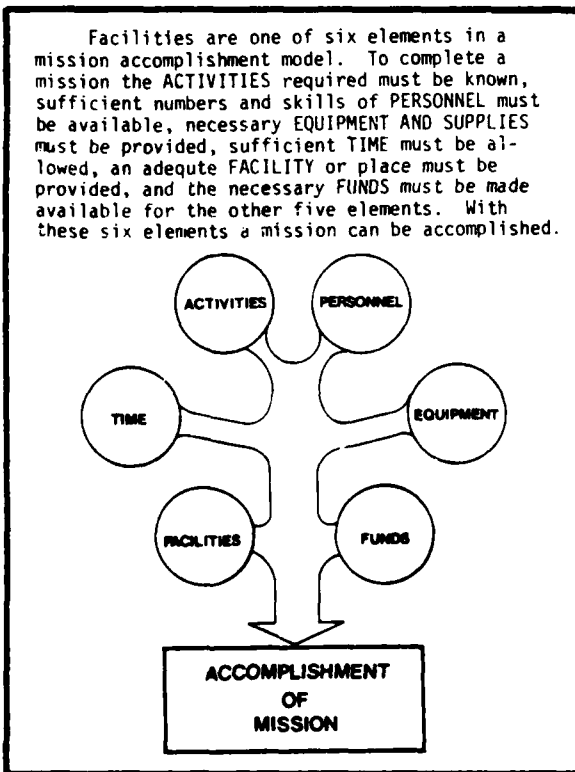


Figure 73. An illustration that reinforces the text.

2. Choose illustrations to expand the text. Illustrations can help make the complexities of an object, setting, or idea clear,

relieving the writer of the chore of explaining such details in the text (Figure 74).

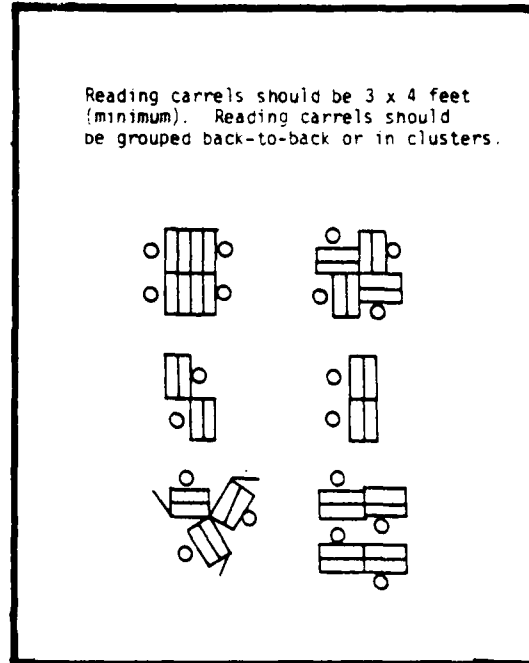


Figure 74. An illustration that expands the text.

3. Choose illustrations to replace the text. It is virtually impossible to present numerical data in textual form. Illustrations, such as graphs, charts, and tables, can effectively present numerical information and replace text (Figure 75).

Approximate Book Shelving Capacities

Number of 3-ft sections*	7 shelves high	5 shelves high
1	1 x 150 = 150	1 x 105 = 105
2	2 x 150 = 300	2 x 105 = 210
3	3 x 150 = 450	3 x 105 = 315
4	4 x 150 = 600	4 x 105 = 420
n	n x 150 =	n x 105 =

*Capacities given in the table are for single-face sections only. Double-face shelving capacities can be calculated if the above products are multiplied by 2.

Figure 75. An illustration that replaces the text.

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Chapter 9

Types of Illustrations

Illustrations must be selected to fit the needs of the information being presented. The major kinds of illustrations are:

Tables

Graphs and Charts

Figures and Diagrams

Photographs

Tables

1. Use tables to organize and summarize information. When it is necessary to show how different kinds of information are related, tables and blocks of information can be grouped. Tabulated information gives the reader an overview not easy to establish with text alone (Figure 76).

2. Use tables for short lists of numerical data. Series of numerical data are difficult to comprehend when presented in textual form (Figure 77).

3. A table is preferred to a graph when a reader must have accurate data. See Figure 78.

Graphs and Charts

1. Use a graph or chart if the reader needs to see the overall concept. Many times the purpose of presenting numerical data is to show trends or relationships. Tables are less effective at conveying such ideas. See Figure 79.

2. Choose scale carefully. If the reader is to extract numerical data from a graph, data points and lines should not be crowded into a small area of the graph (Figure 80).

3. Do not clutter a graph with information. Sometimes the explanatory or qualifying information must be attached to a graph so that the information is not misused. In such cases, it is better to make the graph a segment of the overall illustration which organizes the

	Item	recommended characteristics
room finishes	Walls	Use flat paint, wallpaper or paneling in recommended colors.
	Floor	Use recommended carpeting.
	Doors	Use recommended wood finish.
	Trim	Use recommended wood finish.
furniture/accessories	Seating	Comfortable chairs with casters.
	Tables	Plastic laminate is recommended.
	Curtains	Open weave curtains are recommended to limit direct sunlight. Blackout shades may also be necessary. Colors
		should coordinate with overall scheme.

Decor guidelines for conference rooms.

Figure 76. An example of tabulated information.

PRINCIPLES

Chapter 9

There are a great many colors of metal furniture available from Federal Supply Schedules. The colors that Army is limited to are standard colors offered by sources in the Federal Supply system; generally speaking, these colors (with chip numbers) include blue (25813), gold (20260), yellow (23785), black (27040), parchment (27769), red (21302), and gray (26134). If you want to know what these colors look like, contact your local procurement officer, who will have access to Federal Supply Schedules and/or vendor brochures.

METAL FURNITURE COLORS

25813	BLUE
20260	GOLD
23785	YELLOW
27040	BLACK
27769	PARCHMENT
21302	RED
26134	GRAY

The Army is limited to standard colors of metal furniture offered by the Federal Supply Schedule.

Figure 77. A comparison of textual and tabular data.

SPACE ALLOWANCES FOR EXCHANGE MAIN RETAIL STORE

Space Points	Gross Square Foot Area	Space Points	Gross Square Foot Area
2	500	30-40	19,000
3	1,000	106-128	24,600
4	1,500	129-151	27,000
5	2,000	152-180	29,500
6	2,500	181-202	32,400
7	3,000	203-224	35,300
8	3,500	225-247	38,200
9	4,000	248-270	41,100
10-12	5,000	271-293	44,000
13-15	6,000	294-316	46,900
16-21	7,500	317-339	50,000
22-28	9,000	For each	
29-36	10,500	Add 100	
37-45	12,000	Space Points Add 1,500	
46-55	13,800		
56-67	15,300		
68-75	17,000		
76-83	18,700		

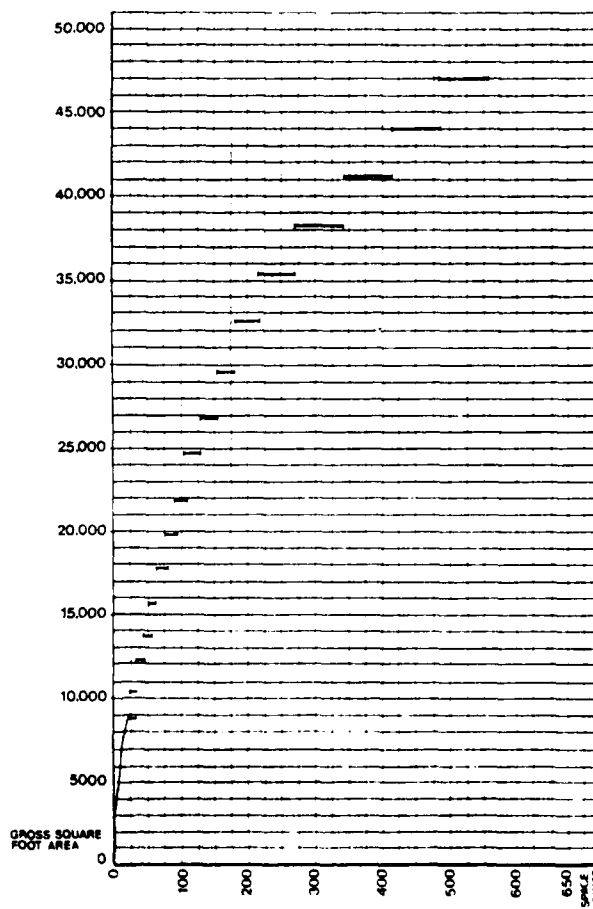


Figure 78. A comparison of tabular and graphed data.

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TYPICAL ELEVATOR USE GRAPH

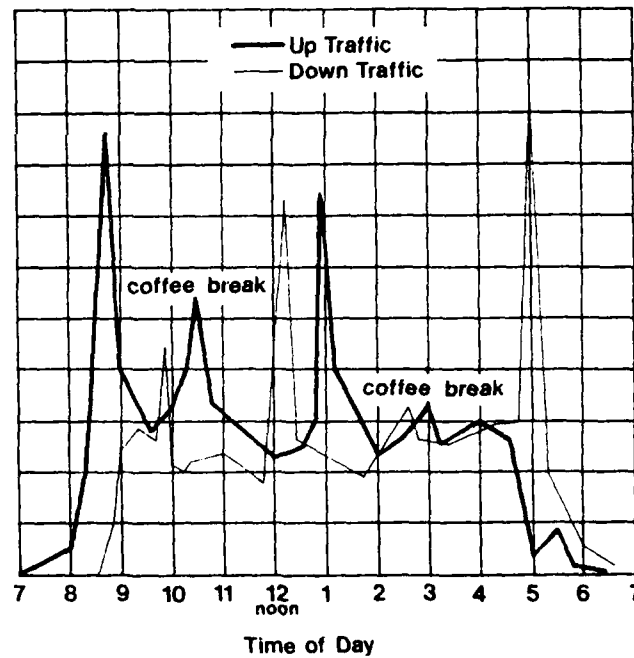


Figure 79. A graph that gives a reader an overview.

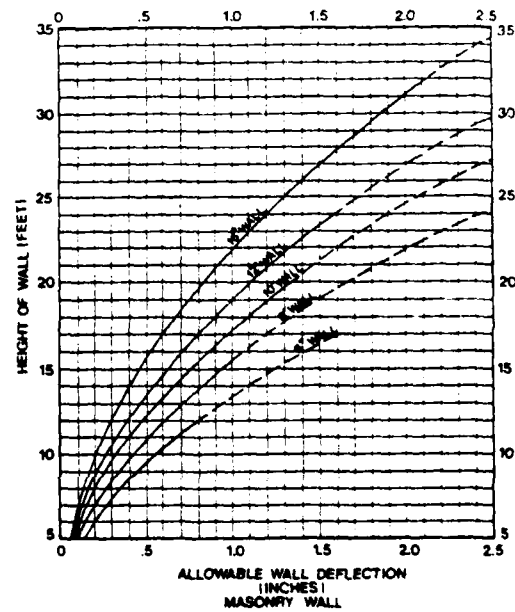
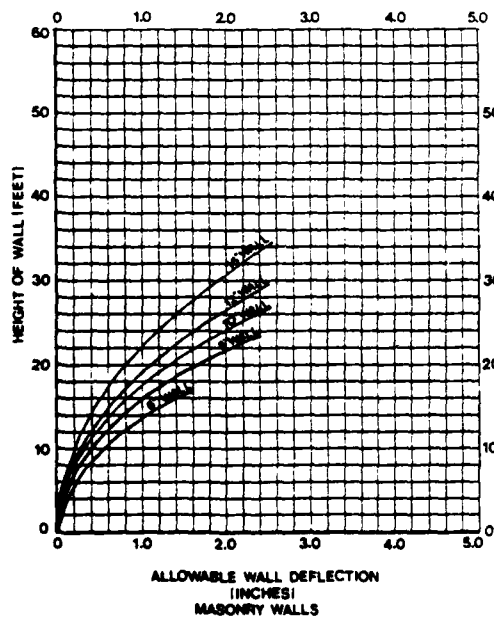


Figure 80. A comparison of scales for a graph.

PRINCIPLES

Chapter 9

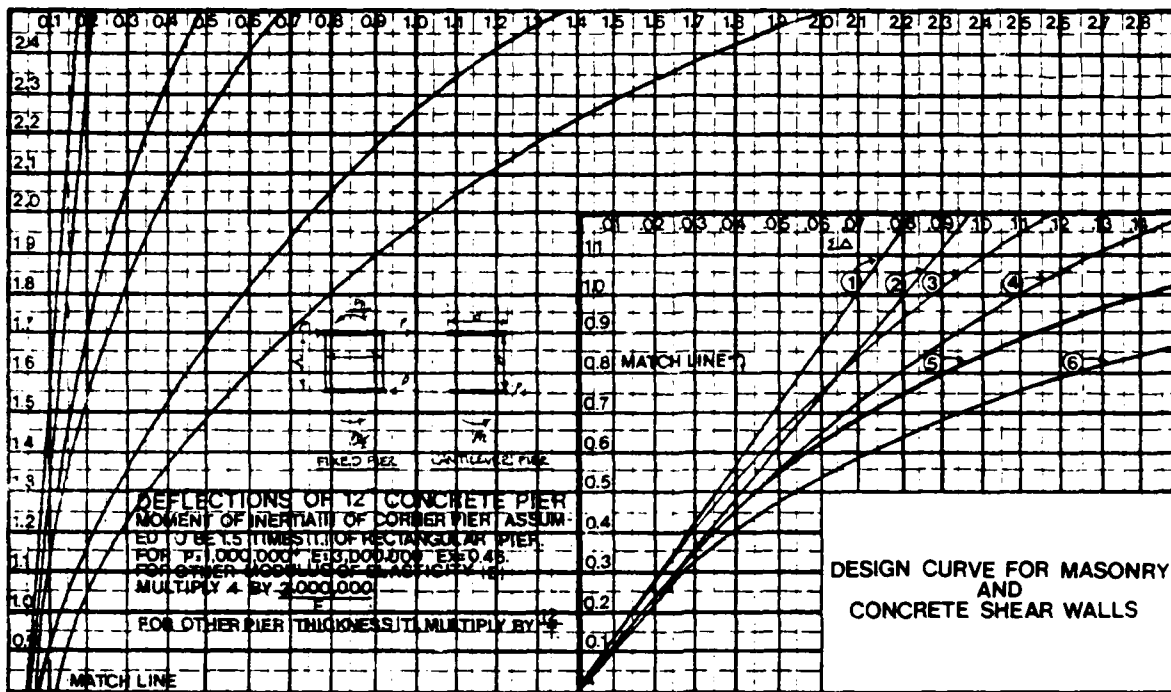


Figure 81. Example of a cluttered graph.

information for the reader (Figure 81).

Figures and Diagrams

1. Keep figures and diagrams simple. Avoid unnecessary detail. Use only key words. See Figure 82.

2. Use a pictorial style. Pictorial styles add a touch of reality to line sketches that might otherwise appear vague (Figure 83).

3. Highlight with color or shading. A problem in the use of color is the cost of printing, but full range of color is not always needed. Illustrations can often be handled well with two colors. If color remains a problem, shading can be used to emphasize or distinguish elements (Figure 84).

4. Avoid unnecessary coding.

To avoid confusing the reader, use complete terms and descriptors when labeling elements in a figure or diagram (Figure 85).

Photographs

Photographs give details to the reader, but some quality is lost in the printing processes. Thus, original photographs must be of high contrast and good quality.

Illustrating Procedures

A number of special kinds of illustrations are helpful in writing procedures and providing instruction. Some of the more common illustrations are:

Job Aids

Logic Trees

Flowcharts

PRINCIPLES

Chapter 9

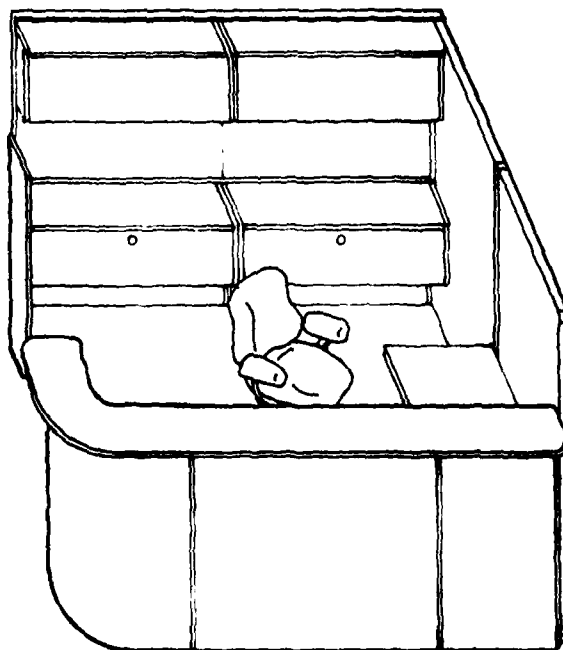
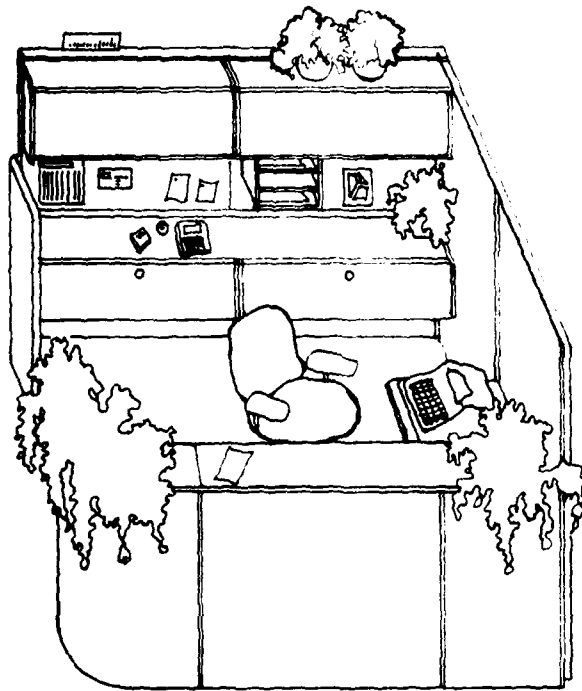


Figure 82. A comparison of detailed and simplified illustrations.

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Figure 83. A pictorial style illustration.

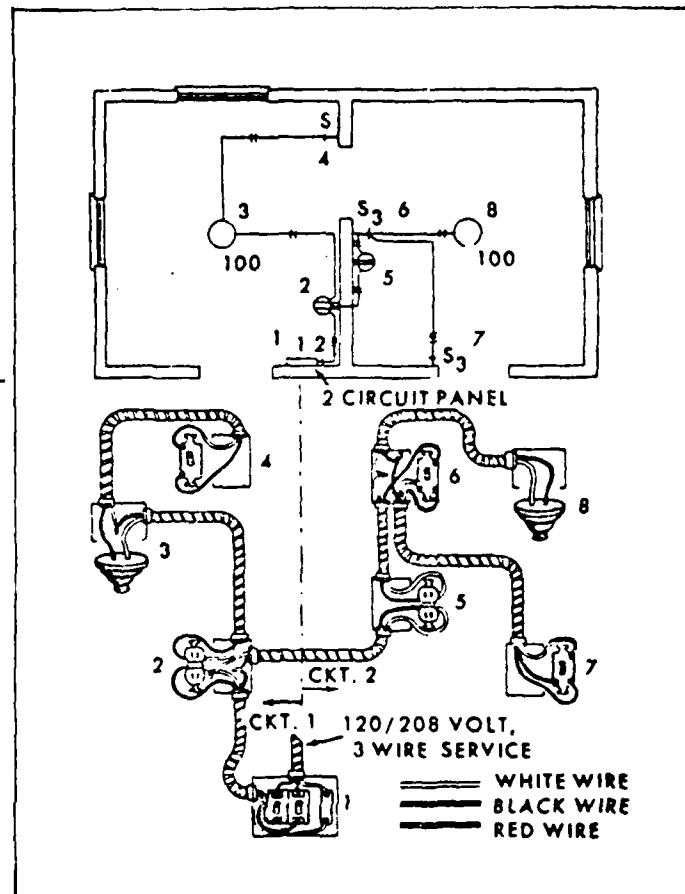
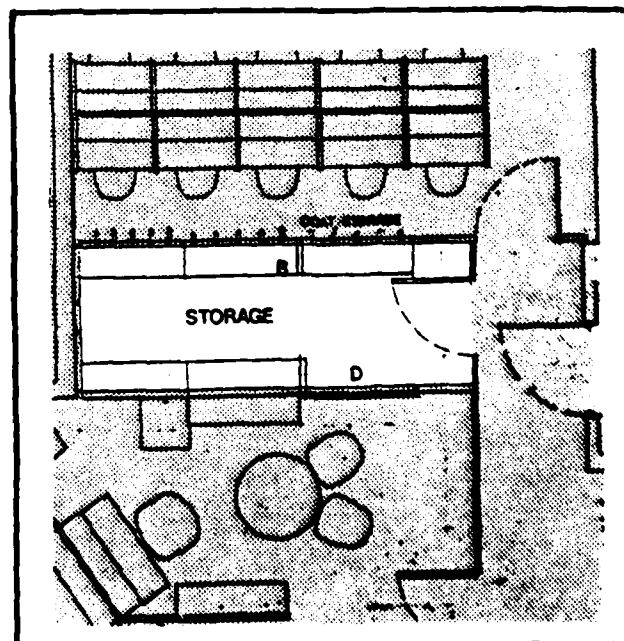


Figure 84. Use of shading to focus a reader's attention.



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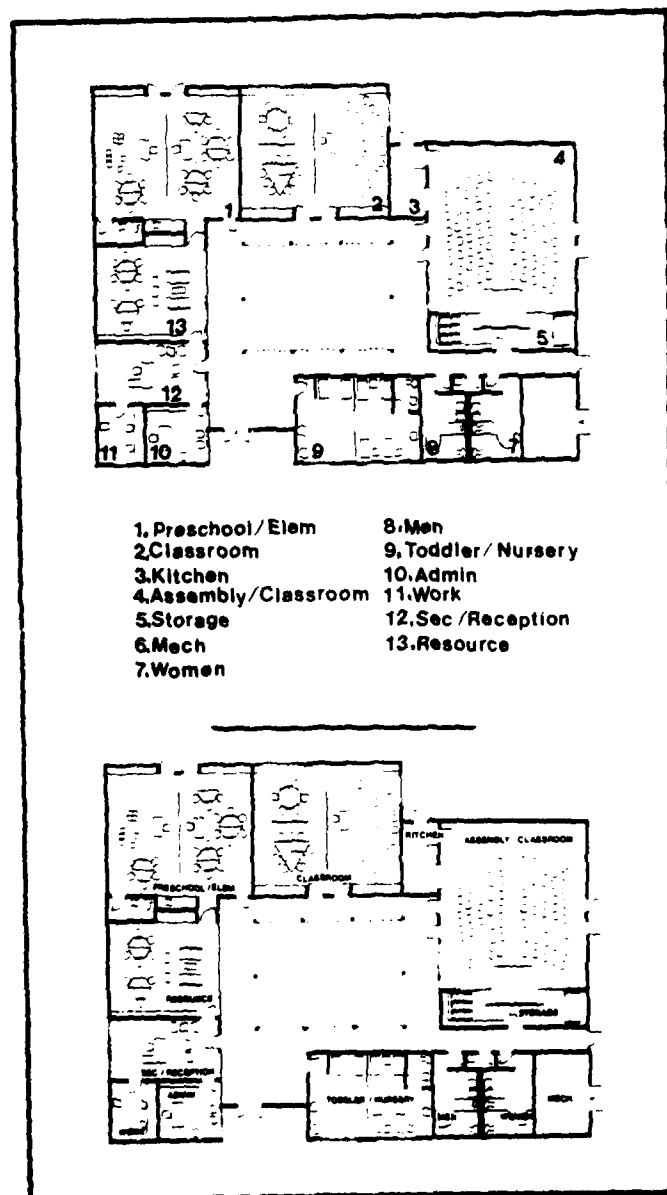


Figure 85. A comparison of coded and uncoded illustrations.

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These types of illustrations help the reader visualize task sequences and make decisions (Figure 86).

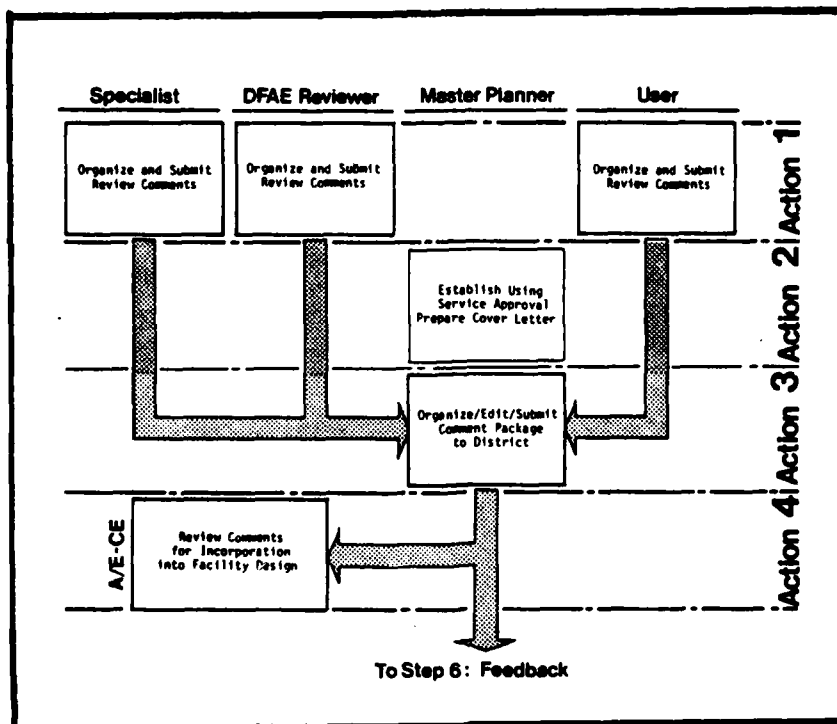


Figure 86. Example of a flowchart.

Information Retrieval Aids

A document may contain very useful information. But, unless the reader can find it, he or she cannot use it. Good document organization and good format can help the reader a great deal.

*Tab*s

Tabs identify major sections (like chapters); tabs are recommended for habitability information documents (Figure 87).

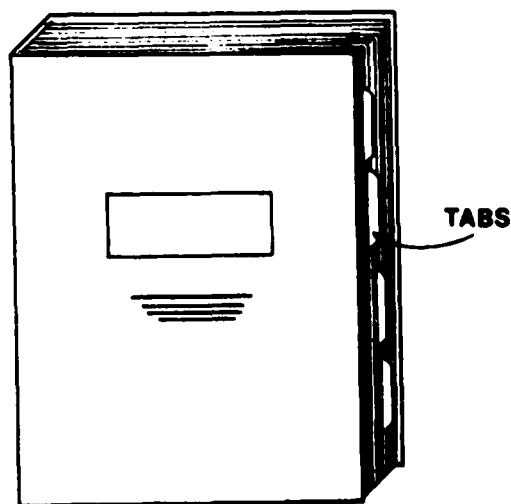


Figure 87. Tabs are an information retrieval aid.

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Chapter 9

Table of Contents

1. Use effective chapter and section titles. For procedural material, chapter and section headings should be phrased as actions. For substantive material, topical headings should be used (Figure 88).

2. Make chapter and section headings distinguishable. Larger and bolder type should be used to label chapters and major section headings in a table of contents. Spaces should be left before and after chapters and sections so that there is a visual break for the reader (Figure 89).

3. Provide a visual relationship between headings and page numbers. It is recommended that dotted leader lines extend from headings to the page column (Figure 90).

Index

If possible, create a good index of terms. The location for information in a document cannot always be determined accurately from a table of contents. Particularly for a reference document, the cost of locating information during the life of that document for all users can be very substantial. The time wasted in locating information can easily be greater than the cost of preparing and distributing the document. It is well worth the effort to prepare a good index for the document contents.

PROCEDURES
CHAPTER 3--PHASE 3. PREPARING INITIAL DRAFT OF DESIGN INFORMATION
OVERVIEW
Goal
Summary
Skills Required
STEP 1- EVALUATING RESOURCE MATERIALS IN DETAIL
Objective
Actions and Suggestions
STEP 2- PREPARING INITIAL DRAFT
Objective
Actions and Suggestions
CHAPTER 4--PHASE 4. UPDATING THE DRAFT DOCUMENT
OVERVIEW
Goal
Summary
Skills Required
STEP 1- INCORPORATING ADDITIONAL PRESCRIPTIVE INFORMATION
Objective
Actions and Suggestions
STEP 2- INCORPORATING DESCRIPTIVE RESOURCES
Objective
Actions and Suggestions
SUBSTANCE
CHAPTER 5--GUIDELINES FOR IMPROVING SCHOOL SPACES
5-1 DESIGN GUIDELINES
a. Accommodations for the Handicapped
b. Security Considerations
c. General Building
(1) Space (size)
(2) Access/circulation
(3) Utilities and waste
(4) Environmental conditions
(a) Lighting
(b) Windows
(c) Sound
(d) Thermal

Figure 88. An example of chapter and section headings for procedural and substantive material.

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Chapter 9

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5-1 GENERAL	5-1
5-2 FUNCTIONAL LAYOUT PRINCIPLES	5-1
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5-3 STRUCTURAL LAYOUT PRINCIPLES	5-11
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5-4 UTILITIES LAYOUT PRINCIPLES	5-15
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6-3 ILLUSTRATIVE DESIGN FOR 150,000 SQ. FT. SCHOOL (CLASSROOM/SHOP RATIO, 6:1)	6-3

Figure 89. A segment of a table of contents.

CHAPTER 5 – SPACE ORGANIZATION PRINCIPLES	
5-1 GENERAL	5-1
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CHAPTER 6 – ILLUSTRATIVE DESIGNS	
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6-2 ILLUSTRATIVE DESIGN FOR 30,000 SQ. FT. SCHOOL ..	6-2
6-3 ILLUSTRATIVE DESIGN FOR 150,000 SQ. FT. SCHOOL (CLASSROOM/SHOP RATIO, 6:1)	6-3
DOTTED LEADER LINE 	

Figure 90. Leader lines in a table of contents help the reader.

SUMMARY

Chapter 10

This report has presented systematic procedures for formulating and updating habitability design information.

Facilities must be planned, designed, and managed so that they contribute effectively to the accomplishment of the organization's mission. Personnel responsible for planning, design, and management activities use design information documents as key references, and habitability is an essential element of most design information.

Habitability design information must be properly prepared and communicated. Unless the information meets the readers' various needs and is convenient to use, it is likely to be ignored or misapplied. The process for preparing habitability design criteria and the principles for writing design information documents discussed in this report are aimed at producing quality documents and increasing the probability that the information in these documents will result in improved Army facilities.

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