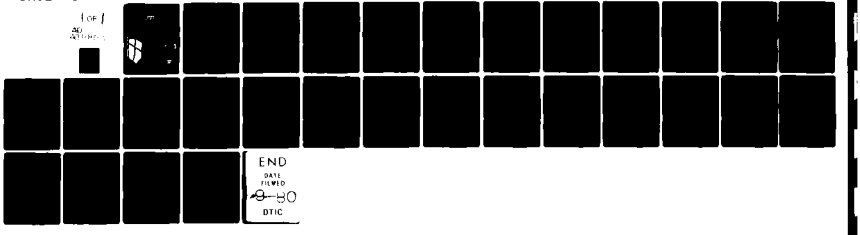
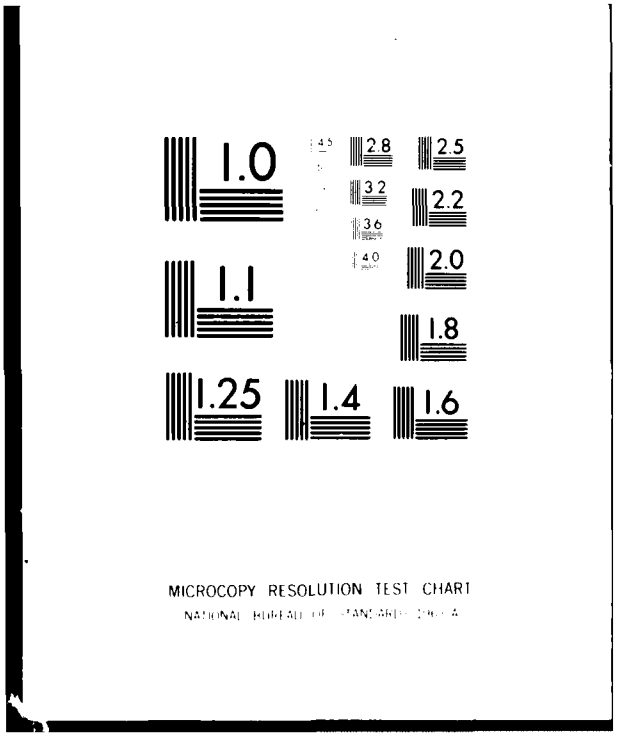
AD-A088 011 CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN IL F/G 13/13
METHODS FOR DEVELOPING HABITABILITY DESIGN CRITERIA.(U)
JUL 80 R L BRAUER
UNCLASSIFIED CERL-IR-P-111 NL



END
DATE FILMED
8-80
DTIC


1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6
MICROCOPY RESOLUTION TEST CHART

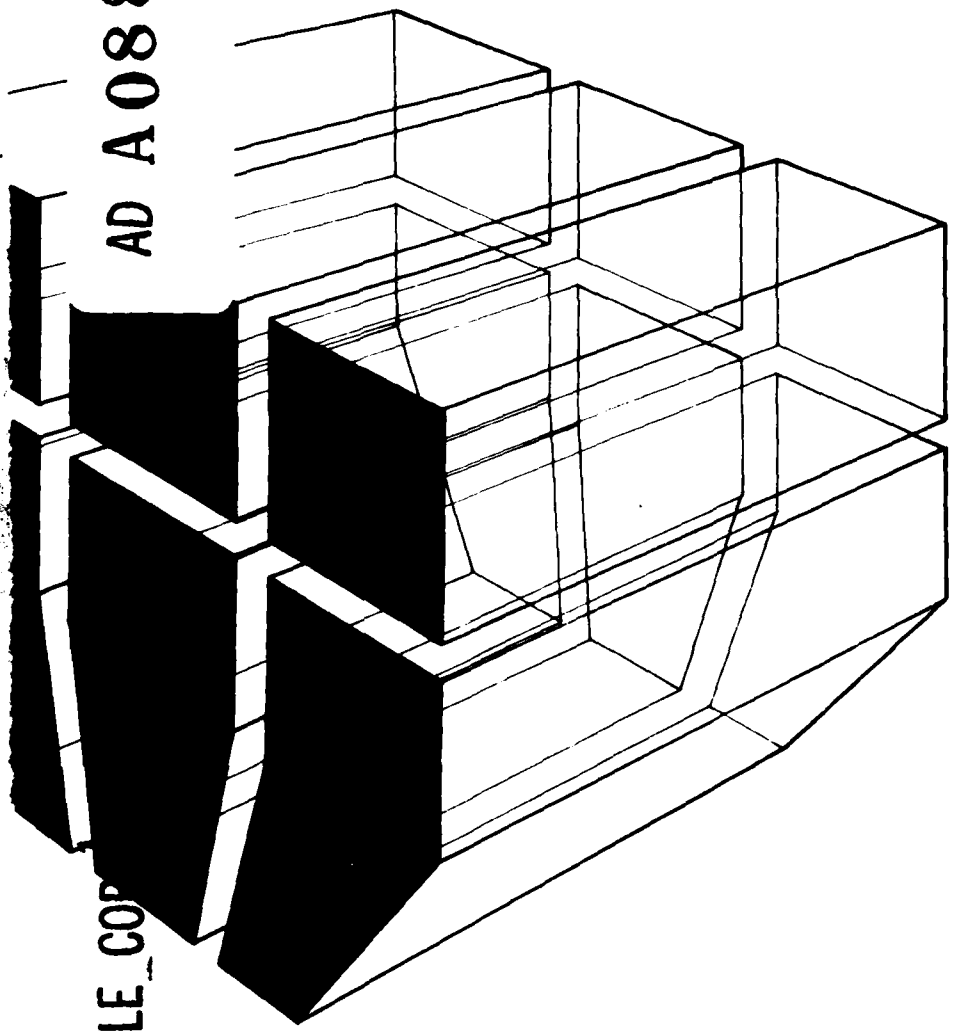
construction engineering research laboratory

United States Army Corps of Engineers
...Serving the Army
...Serving the Nation

INTERIM REPORT P-111
July 1980

LEVEL II

METHODS FOR DEVELOPING HABITABILITY DESIGN CRITERIA



by
R. L. Brauer

CERL

Approved for public release; distribution unlimited.

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER: CERL-IR-P-111 / 2. GOVT ACCESSION NO.: AD-A088 011	3. RECIPIENT'S CATALOG NUMBER:
4. TITLE (and Subtitle): METHODS FOR DEVELOPING HABITABILITY DESIGN CRITERIA.	5. TYPE OF REPORT & PERIOD COVERED: INTERIM
	6. PERFORMING ORG. REPORT NUMBER:
7. AUTHOR(s): R. L. Brauer	8. CONTRACT OR GRANT NUMBER(s):
9. PERFORMING ORGANIZATION NAME AND ADDRESS: U.S. ARMY CONSTRUCTION ENGINEERING RESEARCH LABORATORY P.O. Box 4005, Champaign, IL 61820	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 4A762721AT41 / A-001
11. CONTROLLING OFFICE NAME AND ADDRESS:	12. REPORT DATE: July 1980
	13. NUMBER OF PAGES: 26
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office):	15. SECURITY CLASS. (of this report): Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE:

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Copies are obtainable from the National Technical Information Service
Springfield, VA 22151

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

habitability
architecture
design criteria

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Habitability design criteria are concerned with the ability of facility users and occupants to perform their missions effectively, safely, and with satisfaction. The purpose of this study is to develop procedures that the Office, Chief of Engineers, Corps of Engineers division and district offices, and contractors can use to systematically prepare habitability design criteria. In the first phase of the study, reported here, a prototype procedure was developed and was pilot tested in preparation of an actual design criteria document.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

405279

Block 20 continued.

The major conclusion drawn from the pilot test is that the process for developing habitability design criteria is feasible, although improvements are necessary to make it more efficient and to increase the probability of quality in its application. Other conclusions are as follows:

1. Too much time was spent manipulating, organizing and reorganizing information. Better techniques for managing information items need to be developed.

2. Descriptive and prescriptive information cannot be processed together. To make the process more efficient, existing prescriptive material must be handled first as one phase. Then, descriptive material must be processed in a second phase, translating it into prescriptive form, filling in gaps, and improving first phase material.

3. The time to screen, index, and classify candidate materials must be reduced by developing more precise instructions and improved techniques.

4. Formulation of procedures in a criteria development project can impact the quality of criteria. Instructions must be prepared for assessing the scope and significance of procedures for a criteria development project.

5. The quality of criteria developed is influenced by the criteria writers' ability to differentiate criteria from related forms of design information. Instructions and future training materials for criteria writers may address this problem.

6. The quality of criteria is affected by the writers' ability to judge candidate criteria for Army validity. Techniques must be developed to improve the quality of the judgments.

7. The stage in the criteria development process at which format and document structure are established can influence the quality of criteria. Improvements in the process must address formats more explicitly and provide guidance for structuring a criteria document.

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, "Criteria for Occupant Interaction with Architectural Environments." The OCE Technical Monitor was Robert Shibley, DAEN-MPE-B.

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

Mr. R. G. Donaghy is Chief of EH. COL Louis J. Circeo is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.

CONTENTS

METHODS FOR DEVELOPING
HABITABILITY DESIGN CRITERIA

1 INTRODUCTION

Background

One of the responsibilities of the Chief of Engineers, as defined in AR 10-5,[1] is to develop requirements for improved construction design criteria for the Army, Air Force, and other U.S. Government agencies. AR 415-20[2] further defines this responsibility as developing, maintaining, and promulgating architectural and engineering design criteria for use in providing the Department of the Army with constructed facilities. Because many of the Army's missions are unique or constrained by regulations, Army-specific design criteria must be developed.

Design criteria* are the standards and rules for satisfying a facility's requirements. Criteria are often published in conjunction with general requirements (qualitative statements about what is needed in a facility) and guidance (how to effectively apply criteria to projects).

One goal of design criteria is to ensure that a facility effectively supports the mission and functions of the organizations and people who use it, i.e., to provide habitability. More specifically, design criteria must address the health, safety, morale, and satisfaction of users, the performance of operations and activities, and the security of users, information, and equipment.

A major problem is developing design criteria that address user missions and presenting them in a way that is easy to use. Factors contributing to this problem include (1) the fact that design criteria documents have a variety of users with different needs for information, (2) the need to differentiate design criteria requirements and guidance, (3) the need for an orderly method of developing criteria, (4) the difficulty of systematically identifying or locating criteria already in practice, and (5) the difficulty of determining and retaining information about why a particular criterion was adopted.

---

[1] Organization and Functions - Department of the Army, AR 10-5 (Department of the Army, 1978).

[2] Project Development and Design Approval, AR 415-20 (Department of the Army, 1974).

* The design criteria considered here are those that apply in general to facility types used across the Army or to spaces found in many facilities. Design criteria that apply only to a particular facility or project are generated locally for that project. General criteria may be accepted, modified, or rejected in developing criteria for a particular facility.

The Office, Chief of Engineers, its field offices, and contractors need a means of preparing and communicating habitability criteria that insures their effective use.

Objective

The overall objective of this study is to develop a systematic procedure for formulating or updating habitability design criteria for achieving military facilities which are responsive to missions and functions of users. The objective of the first phase of study, reported here, was to develop and test a prototype procedure.

Approach

In this first phase of work a model of the criteria writing process was laid out. The model, discussed in Chapter 2, identifies necessary activities for developing habitability criteria. Based on that model, a prototype procedure was drafted and then tested by applying it to the preparation of a supplement to Design Guide (DG) 1110-3-106, Design Guide for U.S. Army Service Schools (Chapter 4).

In the second phase, the procedures are to be refined and tested again to identify potential tools for making the procedures easier to use and more effective. In the third phase, the feasible tools will be developed, and in the fourth phase the process will be completed and prepared for field use.

Mode of Technology Transfer

The product of this work will be an Engineer Pamphlet containing procedures for development of habitability design criteria. Training materials will be prepared to help implement the pamphlet.

2 CRITERIA DEVELOPMENT -- DESCRIPTIVE MODEL

General

Before a prototype procedure could be developed, it was necessary to identify the major activities of criteria developers and writers and how the activities relate to each other. An activity model or flow chart was developed to describe and define a typical criteria development process. The scope of each activity in the process was assumed to vary by building type, topic area, availability and suitability of existing application procedures, and type of document.

Criteria Development Model

The process of developing design criteria was organized into the six major activities described below. Figure 1 shows these six activities and their relationships to each other.

Activity 1 -- Determining what information is needed. The goal of this activity is to gain an understanding of the facility or spaces for which criteria are needed and the needs and activities of those who are typically housed in them. This activity may include an investigation of the problems users have had with similar facilities or spaces. It should also include defining the users of the information and how it will be used -- e.g., will the users be architects and engineers, or others who might need more explanatory material. This activity should result in a general definition of the structure, content and media or format for the information.

Activity 2 -- Establishing what is known. The goal here is to search existing literature -- both applications literature (e.g., standards, codes, regulations, and criteria used by various organizations including the Army) and technical literature (e.g., research reports, journal articles). Any material that may prove applicable is held for later evaluation.

Activity 3 -- Evaluating existing information. The potentially applicable material from Activity 2 is evaluated at this point to determine if it can be used for design criteria which meet the needs established in Activity 1. Some evaluation questions include: Is this material suitable for Army facilities? Is it redundant or in conflict with existing criteria? Does the material contain good ideas for which criteria should be developed?

Activity 4 -- Developing new information. If topics are not well covered in existing information, new information must be developed. For example, the recent increased use of self-paced instruction in training facilities -- an equipment-intensive training method -- has resulted in new design problems related to control of noise, waste heat from equipment, and space congestion. In such cases, some further investigation into operations to be housed in the facility as well as studies of technical areas for which criteria are needed may be necessary.

Activity 5 -- Developing supporting procedures. This activity develops methodologies and procedures necessary to use or implement criteria developed

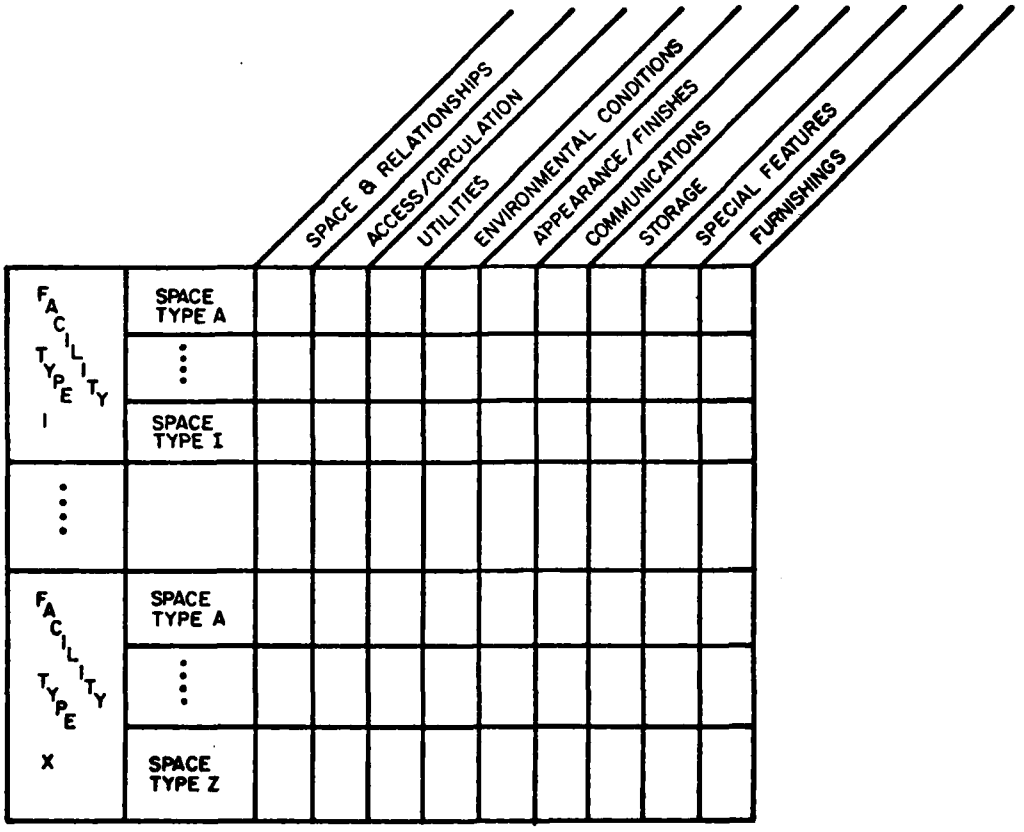


Figure 1. The six activities in developing design criteria.

in Activities 3 and 4. It is necessary to know from Activity 1 who the potential users of the information are and what skills they possess in using criteria. For example, users may need to know how to evaluate a facility to see if noise criteria are satisfied. If these users are not skilled in noise assessment, the procedure must be explained in more detail.

Activity 6 -- Communicating information. This activity is probably the most crucial. The information that has been gathered, developed, and organized must be prepared, formatted, and presented in an effective manner for potential users of the criteria.

3 A PROTOTYPE PROCEDURE

A prototype procedure for criteria development was formulated based on the model discussed in Chapter 2. This procedure provides an objective for each activity and divides the activity into a series of steps.

Activity 1 -- Determine What Information Is Needed

Objectives

In this activity, a criteria writer determines what information is needed, why it is needed, what user problems it will help solve or prevent in facilities, who will use it, and how it is to be used (Figure 2).

Step 1

The criteria writer's first step is to determine the basis for the information needed; that is, what precipitated the issue and what factors led to the conclusion that facility criteria could help solve the problem. The need for design criteria comes from many different sources: user complaints, facility evaluations, new Federal laws, and new DOD or Army policies. The criteria writer must locate the letters, memos, reports, policy statements, or laws which formalize the problem and define the need for design criteria to help solve it.

Step 2

After gaining an initial understanding of the problem or need for design criteria, the writer must (1) investigate the issues in more depth, (2) gain an understanding of the user activities and their interfaces with facilities as defined by the problem, and (3) develop some appreciation for the mission and functions of the facility users and the constraints under which they operate. What is required or expected from the facility must be understood. One item which must be clearly determined in Step 2 is the facility type or types involved and the kinds of spaces required within those facility types.

Step 3

The writer must determine who will be the primary user of the habitability design criteria and how those criteria will be used in the Army's facility delivery process. Any Army project which improves existing facilities or constructs new facilities involves a number of organizations or groups: facility occupants, installation Facilities Engineering staff, division and district office staff, major command personnel, and others at various Army staff levels may have a role in the project. It is essential that the criteria writer establish at the very outset who will be using the information and the kinds of projects for which it will be used.

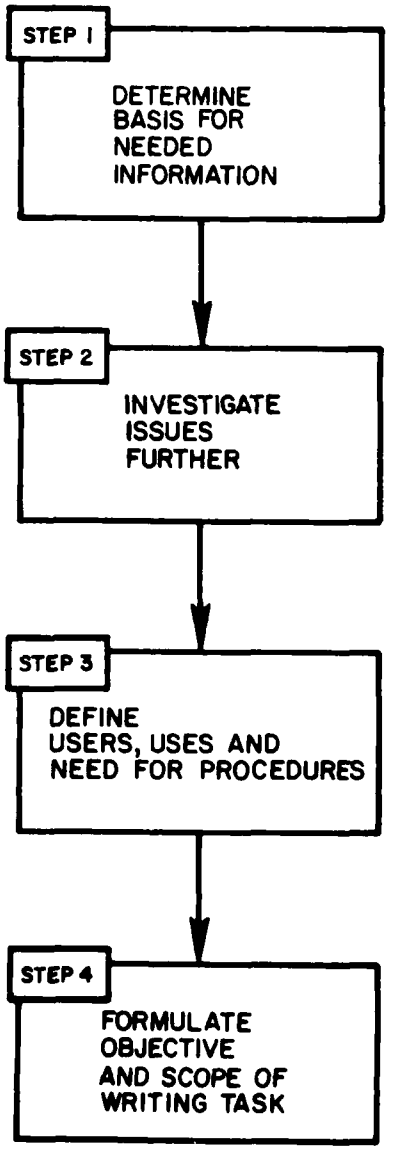


Figure 2. Steps in activity 1 - determining what information is needed.

Step 4

The criteria writer must use information gathered in the first three steps to formulate an objective or statement which defines the scope of the criteria writing task. The scope should identify (1) the topics to be covered, (2) the user and uses for the criteria, (3) the media of the criteria presentation (e.g., a workbook, training document, design reference document), (4) the contents (in outline form), and (5) if necessary, the format of the document. Unless such an objective is prepared, it becomes easy to digress and begin to focus on problems, facilities, or kinds of space for which criteria are not needed.

Activity 2 -- Establish What Is Known

Objective

The goal of this activity is to gather as much existing resource material as possible for preparing design criteria to meet the scope defined in Activity 1 (Figure 3).

Step 1

The first step is to identify candidate resource documents. Such documents can be Army documents containing existing design criteria, documents of other military organizations, DOD documents, federal documents, building codes, laws, general design reference documents, or any other written materials a designer might use. In addition, information can come from research articles, professional design periodicals, or other professional publications. Another resource is documents internal to the Army such as correspondence, memos, survey reports, policy statements, or public speeches.

In some cases, candidate resource documents can be identified through computer retrieval systems; however, manual searching is often the only possible method.

Step 2

Next, it is necessary to obtain copies of the candidate resource documents. This is often a lengthy process, taking up to 6 months before all requested materials have been received. Costs are involved also, since materials must usually be purchased through normal procurement channels.

As documents are received, it is important to establish a log-in process to keep track of them.

Step 3

After documents have been received and logged in, they should be reviewed to locate and flag potentially relevant parts. Not only is this step time-consuming, it also requires some expertise on the part of the document reviewer, who must be able to discern the relevant items.

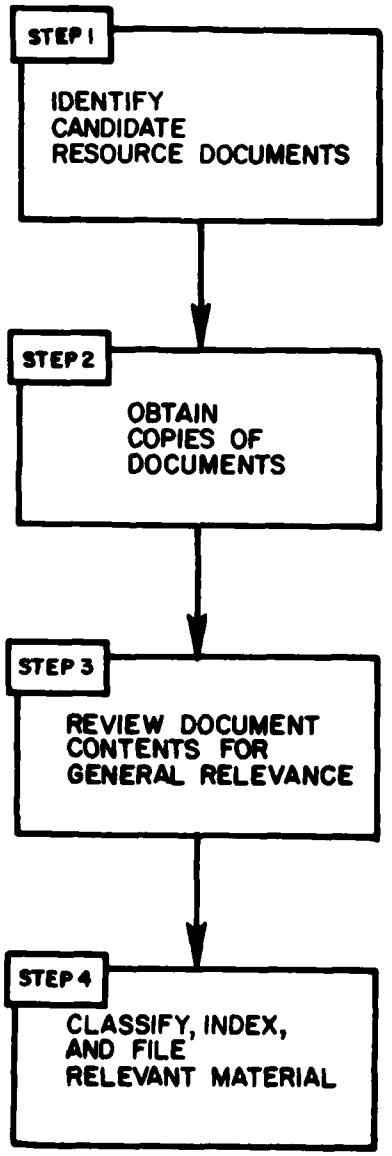


Figure 3. Steps in activity 2 - establishing what is known.

Step 4

A system for classifying and indexing the relevant information must be established. It must cover facility types, space types, and habitability topics of concern, and must deal with the variety of activities of the facility's anticipated users. Once materials have been classified and indexed, they must be filed so they can be located for use in future activities. The classification, indexing, and filing system plays a key role in establishing the effort involved in subsequent activities and steps in the criteria development process.

Activity 3 -- Evaluate Information

Objective

The goal of this activity is to determine if existing material is relevant and suitable for the information needs defined in Activity 1 (Figure 4).

Step 1

The material was screened in Activity 2 for general relevance only; in this step, it must be reviewed in detail to determine if it is applicable to a specific facility or space type. A logical way to retrieve material from the files is to take one space type or room type at a time and review all materials for that type of space.

Step 2

A judgment must be made to determine whether the relevant information is valid -- particularly for Army applications. One might assume that because information is in print or has been used by others, it has intrinsic validity; however, that is not necessarily the case. It is best, in reviewing material, to go back to the most original source possible to determine the initial basis for the information -- and whether that basis is valid. Indiscriminate use of information can result in continuing someone else's error.

Step 3

After material has been judged relevant and valid for Army applications, it should be further sorted into one of three categories: requirements, criteria, or guidance. Requirements are statements about what is needed in a facility and are generally qualitative. Criteria are the standards, usually quantitative, which satisfy the requirements. Guidance, which may be in tabular, graphical, or explanatory form, describes how to apply criteria effectively in solving a facility problem. A simple notation system can be used to mark the applicable category on information items before they are refiled for use in subsequent steps.

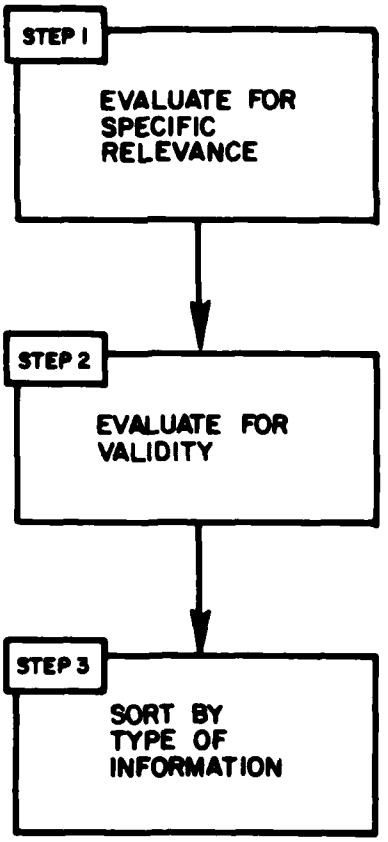


Figure 4. Steps in activity 3 - evaluating information.

Activity 4 -- Develop or Generate New Information

Objective

The goal of this activity is to identify whether information needs are satisfied by existing criteria and, if feasible, to develop information to fill gaps (Figure 5).

Step 1

The writer must determine where gaps in information exist because current information is not applicable, invalid, or missing. One way to identify these gaps is to prepare a matrix of information categories for each space type and mark in the matrix where information is available. The empty spaces in the matrix then indicate missing information. An example of such a matrix is shown in Figure 6.

Step 2

The next step is to decide what to do about missing information. In some cases, it may be appropriate to leave a gap in information because it is covered elsewhere, under topics that apply across the building type, or is information typical of spaces found in nearly all kinds of buildings. The feasibility of applying existing data from related facilities and user activities to fill in missing information should be determined. Although this approach would provide only an estimate of what the missing information should be, it may be necessary because of cost, time, or other factors. If it is felt, however, that an estimate is inadequate and could result in significant errors, special studies may be required.

Step 3

If a special study appears necessary to fill a gap in criteria, the need should be noted and a recommendation made to those responsible for initiating such investigations. In the meantime, preparation of other criteria should not be delayed. If missing information is critical for criteria users and a study to fill the gap in information is in progress, it may be beneficial to include a statement in a criteria document informing readers that criteria are being developed and directing readers to those responsible for the study.

Activity 5 -- Develop Supporting Procedures

Objectives

The purpose of this activity is to develop procedures for using design criteria where such procedures are not available to meet the scope defined in Activity 1 (Figure 7).

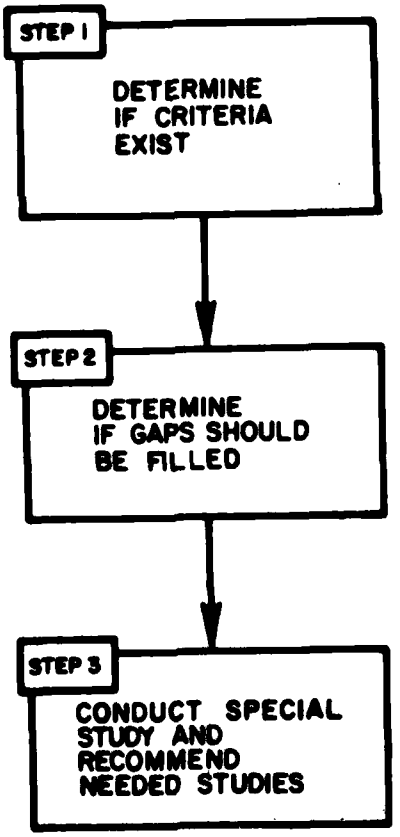


Figure 5. Steps in activity 4 - developing or generating new information.

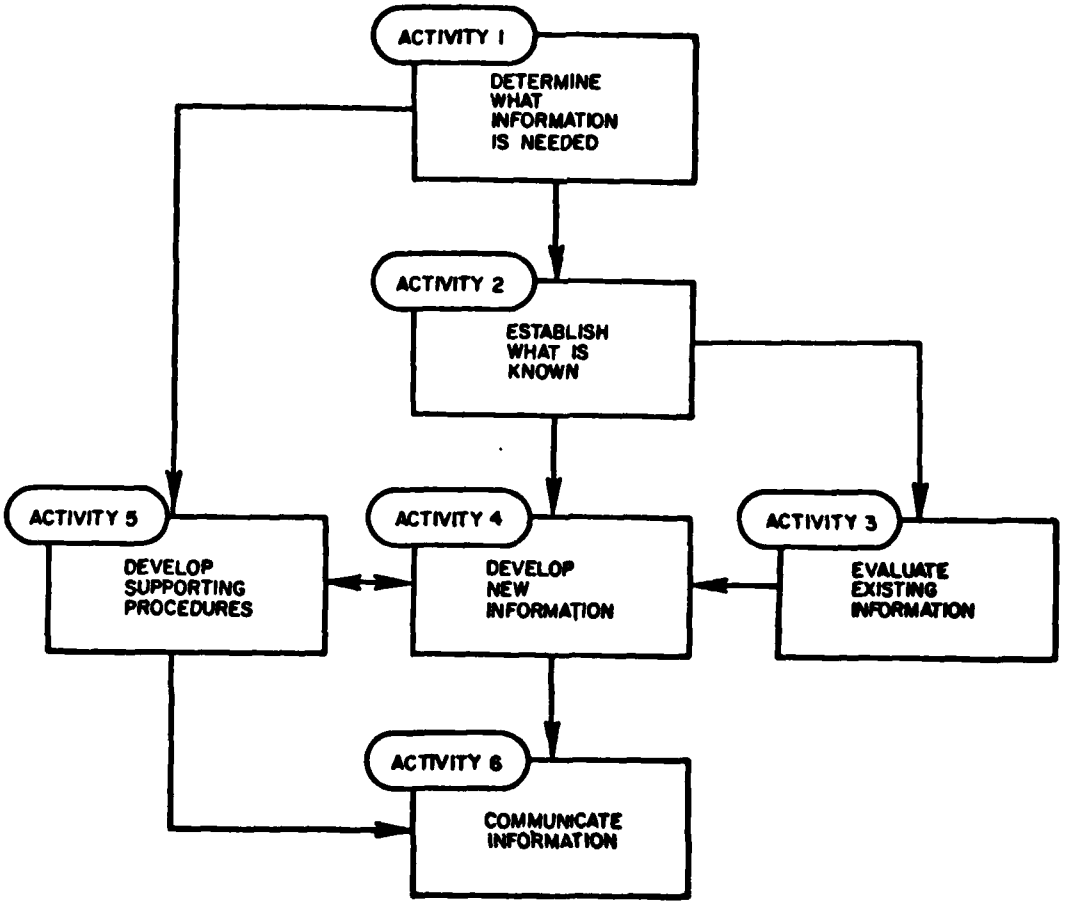


Figure 6. Example of a matrix for locating gaps in information.

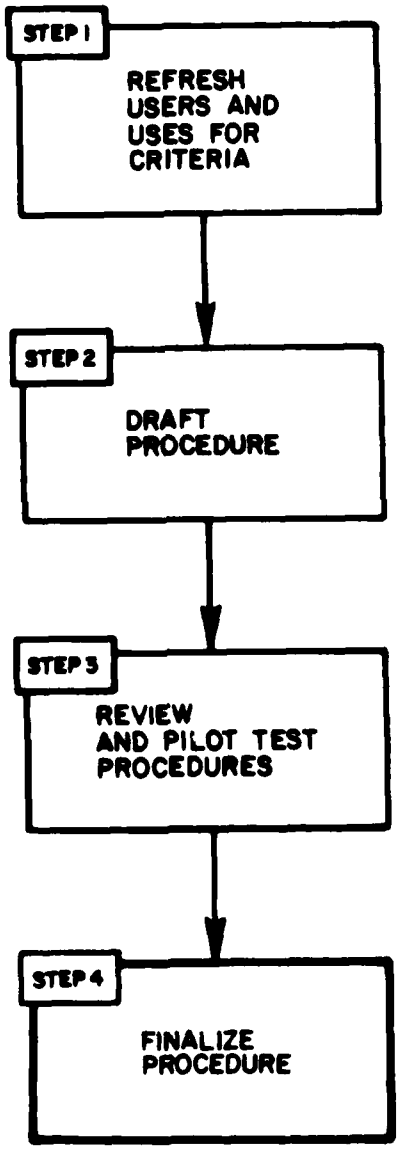


Figure 7. Steps in activity 5 - develop supporting procedures.

Step 1

If some time has passed since Activity 1 was completed, criteria developers should remind themselves who the users of the design criteria are and how the criteria will be used.

Step 2

With the users and uses in mind, a writer can begin to draft a procedure which meets the goals defined in Activity 1. The procedure should be laid out step-by-step using some of the principles discussed below.

Step 3

The drafted procedure should be reviewed by a user group or by those who are knowledgeable about the users to determine whether the procedures are comprehensive, understandable, and can be implemented. If possible, the procedures should be tested with a sample user group.

Step 4

Problems identified in the review or tests should be resolved and recommendations of users and reviewers incorporated into a final version of the procedures.

Principles

Several principles should be observed in the writing of procedures. Some of these are identified below; others appear in guidelines for the development of training literature and materials. For example, The Guidebook for the Development of Army Training Literature contains many useful recommendations for preparing instructional material.[3]

1. Distinguish procedures from criteria -- i.e., what a person should do must be clearly distinguished from material used in completing a task. It is best to place procedural information in a separate chapter from criteria.

2. Do not confuse procedures for different users or tasks. As indicated earlier, there may be a number of different users of design criteria, each using information for different purposes. Consequently, procedures should clearly indicate who should do what. If a series of instructions is given, the person(s) responsible for completing each instruction should be clearly identified.

3. Use job aids wherever possible. Job aids are step-by-step instructions in a variety of formats. A job aid tells an individual what must be done and in what order. Graphical flowcharts, logic diagrams, and other devises can be incorporated into job aids to help the individual understand the sequence or to recognize what other materials are needed within each step.

---

[3] Guidebook for the Development of Army Training Literature, ADA033935 (U.S. Army Research Institute, November 1975).

4. Use simple, understandable language and sentence structure. While jargon should be avoided, words unique to the Army but clearly understood by the reader may be desirable.

Activity 6 -- Communicate Information

Objective

The goal of this activity is to present design criteria in the best possible manner to insure they are used (Figure 8).

Step 1

The first step in this activity is to finalize the selection of the medium for communicating the habitability design criteria. Preliminary selection was made in Activity 1, Step 4. In most cases, a written document will be the primary medium, with audio-video materials sometimes required to complement it. A few cases may require charts or other kinds of visual aids. The type of document should be selected carefully. Typical documents used to communicate design criteria are design guides, engineer pamphlets, DA pamphlets, and technical manuals.

Step 2

Format rules must be determined for the medium selected. Standard types of documents have formal format requirements; for example, technical manuals fall under AR 310-3[4] and engineer pamphlets under AR 310-2.[5]

Step 3

In Activity 1, Step 4, the topics to be covered were identified. After the medium and format have been determined, a detailed outline of contents should be prepared. Although the outline can be modified as the material is written, it should always be available as a basis for preparing the draft.

Step 4

A draft criteria document should be prepared based on the outline. It may be necessary to prepare the draft as a mockup of the final document to help the writer recognize potential problems with the layout, organization, or clarity of presentation. Such problems are not always apparent if the draft is completed in manuscript format only.

---

[4] Preparation, Coordination, and Approval of Department of the Army Publications, AR 310-3 (Headquarters, Department of the Army (DA), 1968).

[5] Identification and Distribution of DA Publications and Issue of Agency and Command Administrative Publications, AR 310-2 (DA, 1976).

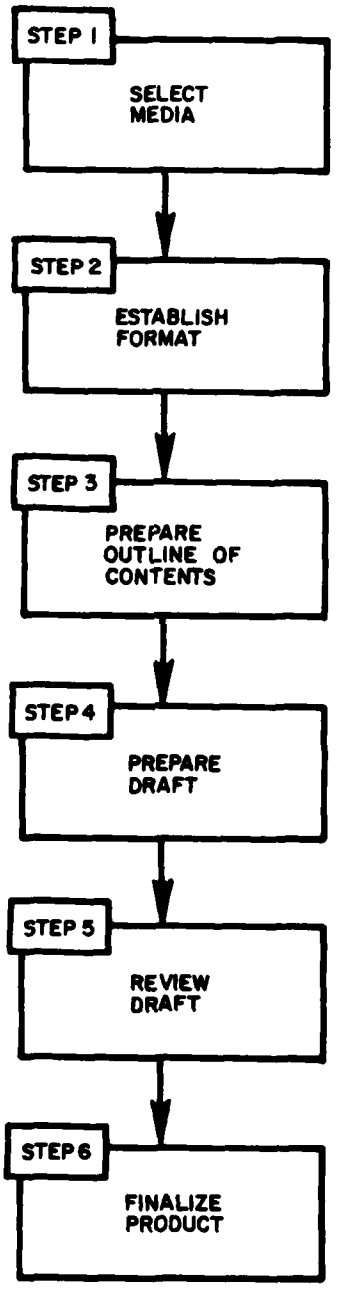


Figure 8. Steps in activity 6 - communicate information.

Step 5

After a draft document has been prepared, it should be reviewed by a sample of users to check for ease of use, and by managers at higher levels to determine if command goals are met. Such reviews will help identify and resolve problems.

Step 6

The document should be modified to incorporate appropriate review comments in the final version. This final version may be in manuscript format (e.g., for AR 310-3 documents) or in camera-ready form, depending on the type of document and the requirements of the publishing agency.

Principles of Document Preparation

Several principles should be followed in documenting design criteria.

1. Procedures should be separated from criteria. The reader should be able to see a clear distinction between the tasks which must be performed and the material which will be used in completing those tasks.

2. Use clear, simple language. The reading level should be adjusted so that it does not exceed the level typically expected for users. Wordiness should be avoided. The user review in Step five is helpful in identifying problems with clarity.

3. Illustrations and tables should be used wherever possible. Examples should be provided.

4. Requirements, criteria, and guidance information should be distinguished from each other wherever possible. However, the relationship between a particular requirement and corresponding criteria and guidance to help resolve that requirement should be apparent.

References

Many good references tell how to prepare documents and audiovisual materials; some are listed below:

1. Guidebook for the Development of Army Training Literature, ADA033935 (U.S. Army Research Institute, November 1975).

2. Elmo E. Miller, Designing Printed Instructional Materials: Content and Format, HumRRO RP-WD(TX)-75-4 (Human Resources Research Organization, October 1975).

3. W. Strunk and E. B. White, The Elements of Style, Revised Edition (McMillan, 1970).

4 PILOT TEST AND RESULTS

Objective of Test

The purpose of the pilot test was to determine the feasibility of the design criteria development process outlined in Chapter 3 and to identify fundamental problems with that process.

Pilot Test Document

A supplement to Design Guide 1110-3-106, U.S. Army Service Schools, was identified as a document which could be developed as a pilot test for this work. The need for such a supplement had been identified by the U.S. Army Training and Doctrine Command (TRADOC) and the Office, Chief of Engineers to provide school commanders and staff with guidelines for upgrading and renovating U.S. Army Service Schools. (The original Design Guide focused on new construction and was written primarily for designers.)

Results

The development of a Design Guide supplement as a pilot test document allowed for testing of nearly all steps identified in Chapter 3. Development began in December 1978 and concluded in October 1979.

The pilot test identified two major problem areas: (1) the amount of time and labor required to complete the activities and steps, and (2) the knowledge and skills required.

One of the time-consuming tasks was evaluation of candidate materials for use in the test document. It was not difficult to locate potential resource documents -- there are a number of indices and computer programs for conducting literature searches. However, once copies of the candidate resource documents were obtained, they had to be read and relevant parts identified. Their contents had to be classified, indexed, and judged for relevancy and validity. This task consumed about 15 percent of the total time required to develop the supplement.

Another labor-intensive problem that extended across several activities involved the simple manipulation of pieces of information. Because the materials had to be organized, reviewed, and reorganized in developing the Design Guide supplement; about 35 percent of the total time was spent cutting, pasting, and filing bits of information. This manipulation from one activity to another was the most labor-intensive activity in the whole process.

A third significantly labor-intensive activity was developing procedures necessary to meet the goals of the Design Guide supplement; similar procedures for another application were not available as a model. In addition, the procedures had to be customized to meet the needs of service school commandants and personnel.

Some problems resulted because the tasks were difficult to perform and required either a long learning curve or previous experience with the subject material. For example, one task which required a learning curve was differentiating types of information (requirements, criteria, guidance, and other forms of information).

In Activity 3, Step 2, material must be judged for validity. This judgment proved difficult for two reasons. First, the reviewers' lack of experience with the application of design criteria and limited knowledge of school operations made it difficult to estimate validity and relevance to Army schools. Second, little time was available to make these judgments, because of other labor-intensive activities. Quality control activities such as judging validity tend to get less attention when time is short.

A learning curve is also required to understand the format for the criteria document being produced. The criteria writer must establish at an early stage how the document should be structured and where various kinds of information belong.

Another problem concerned special information, case studies, or information which is not readily generalized or translated into criteria. Both basic information (which is already in a prescriptive* format) and various kinds of special information (in a descriptive format) were handled with the same priority in early activities of the process. This created difficulty because the special information required more careful study to determine if -- and where -- it could be used in formulating a new document. For example, an article that described a solution for a particular building -- in descriptive terms -- was not easy to translate into a prescriptive format. In addition, the reviewer had to decide if the information in the article was generally applicable to the facility or spaces under consideration. In contrast, information obtained from prescriptive sources was already in an easily translated format and more likely to be basic, fundamental, or general information.

* Prescriptive information states what must be done or how things should be; e.g., laws, rules, codes, standards, recommendations, criteria, requirements, and guidance. Descriptive information describes or explains an existing condition, relationship, or characteristic. It states how things are or were. News reports, magazine articles, and research reports are typically written in this style.

5 CONCLUSIONS

The major conclusion drawn from the pilot test is that the process for developing habitability design criteria is feasible, although improvements are necessary to make it more efficient and to increase the probability of quality in its application. Other conclusions are as follows:

1. Too much time was spent manipulating, organizing, and reorganizing information. Better techniques for managing information items need to be developed.

2. Descriptive and prescriptive information cannot be processed together. To make the process more efficient, existing prescriptive material must be handled first as one phase. Then, descriptive material must be processed in a second phase, translating it into prescriptive form, filling in gaps, and improving first phase material.

3. The time to screen, index, and classify candidate materials must be reduced by developing more precise instructions and improved techniques.

4. Formulation of procedures in a criteria development project can impact the quality of criteria. Instructions must be prepared for assessing the scope and significance of procedures for a criteria development project.

5. The quality of criteria developed is influenced by the criteria writers' ability to differentiate criteria from related forms of design information. Instructions and future training materials for criteria writers must address this problem.

6. The quality of criteria is affected by the writers' ability to judge candidate criteria for Army validity. Techniques must be developed to improve the quality of the judgments.

7. The stage in the criteria development process at which format and document structure are established can influence the quality of criteria. Improvements in the process must address formats more explicitly and provide guidance for structuring a criteria document.

CERL DISTRIBUTION

Chief of Engineers
ATTN: Tech Monitor
ATTN: DAEN-RD
ATTN: DAEN-MP
ATTN: DAEN-ZC
ATTN: DAEN-CW
ATTN: DAEN-RM
ATTN: DAEN-CCP
ATTN: DAEN-ASI-L (2)

US Army Engineer Districts
ATTN: Library
Alaska
Al Batin
Albuquerque
Baltimore
Buffalo
Charleston
Chicago
Detroit
Far East
Fort Worth
Galveston
Huntington
Jacksonville
Japan
Jidda
Kansas City
Little Rock
Los Angeles
Louisville
Memphis
Mobile
Nashville
New Orleans
New York
Norfolk
Omaha
Philadelphia
Pittsburgh
Portland
Riyadh
Rock Island
Sacramento
San Francisco
Savannah
Seattle
St. Louis
St. Paul
Tulsa
Vicksburg
Walla Walla
Wilmington

US Army Engineer Divisions
ATTN: Library
Europe
Huntsville
Lower Mississippi Valley
Middle East
Middle East (Rear)
Missouri River
New England
North Atlantic
North Central
North Pacific
Ohio River
Pacific Ocean
South Atlantic
South Pacific
Southwestern

Waterways Experiment Station
ATTN: Library

Cold Regions Research Engineering Lab
ATTN: Library

US Government Printing Office
Receiving Section/Depository Copies (2)

Defense Technical Information Center
ATTN: DDA (12)

Engineering Societies Library
New York, NY

FESA, ATTN: Library

ETL, ATTN: Library

Engr. Studies Center, ATTN: Library

Inst. for Water Res., ATTN: Library

Army Instl. and Major Activities (CONUS)
DARCOM - Dir., Inst., & Svcs.
ATTN: Facilities Engineer
ARRADCOM
Aberdeen Proving Ground
Army Matls. and Mechanics Res. Ctr.
Corpus Christi Army Depot
Harry Diamond Laboratories
Dugway Proving Ground
Jefferson Proving Ground
Fort Monmouth
Letterkenny Army Depot
Natick Research and Dev. Ctr.
New Cumberland Army Depot
Pueblo Army Depot
Red River Army Depot
Redstone Arsenal
Rock Island Arsenal
Savanna Army Depot
Sharpe Army Depot
Seneca Army Depot
Tobyhanna Army Depot
Tooele Army Depot
Watervliet Arsenal
Yuma Proving Ground
White Sands Missile Range

FORSCOM
FORSCOM Engineer, ATTN: AFEN-FE
ATTN: Facilities Engineers
Fort Buchanan
Fort Bragg
Fort Campbell
Fort Carson
Fort Devens
Fort Drum
Fort Hood
Fort Indiantown Gap
Fort Irwin
Fort Sam Houston
Fort Lewis
Fort McCoy
Fort McPherson
Fort George G. Meade
Fort Ord
Fort Polk
Fort Richardson
Fort Riley
Presidio of San Francisco
Fort Sheridan
Fort Stewart
Fort Wainwright
Vancouver Bks.

TRADOC
HQ, TRADOC, ATTN: ATEN-FE
ATTN: Facilities Engineer
Fort Belvoir
Fort Benning
Fort Bliss
Carlisle Barracks
Fort Chaffee
Fort Dix
Fort Eustis
Fort Gordon
Fort Hamilton
Fort Benjamin Harrison
Fort Jackson
Fort Knox
Fort Leavenworth
Fort Lee
Fort McClellan
Fort Monroe
Fort Rucker
Fort Sill
Fort Leonard Wood

INSCOM - Ch, Instl. Div.
ATTN: Facilities Engineer
Vint Hill Farms Station
Arlington Hall Station

WESTCOM
ATTN: Facilities Engineer
Fort Shafter

MDW
ATTN: Facilities Engineer
Cameron Station
Fort Lesley J. McNair
Fort Myer

HSC
HQ USAHSC, ATTN: HSLO-F
ATTN: Facilities Engineer
Fitzsimons Army Medical Center
Walter Reed Army Medical Center

USACC
ATTN: Facilities Engineer
Fort Huachuca
Fort Ritchie

MTMC
HQ, ATTN: MTMC-SA
ATTN: Facilities Engineer
Oakland Army Base
Bayonne MOT
Sunny Point MOT

US Military Academy
ATTN: Facilities Engineer

USAFS, Fort Belvoir, VA
ATTN: FE Mgmt. Br.
ATTN: Const. Mgmt. Br.
ATTN: Engr. Library

Chief Inst. Div., I&SA, Rock Island, IL

USA ARRCOM, ATTN: Dir., Instl & Svc
TARCOM, Fac. Div.
TECOM, ATTN: DRSTE-LG-F
TSARCOM, ATTN: STSAS-F
NARAD COM, ATTN: DRDNA-F
AMMRC, ATTN: DRXMR-WE

HQ, XVIII Airborne Corps and
Ft. Bragg
ATTN: AFZA-FE-EE

HQ, 7th Army Training Command
ATTN: AETTG-DEH (5)

HQ USAREUR and 7th Army
ODCS/Engineer
ATTN: AEAEN-EH (4)

V Corps
ATTN: AETVDEH (5)

VII Corps
ATTN: AETSDEH (5)

21st Support Command
ATTN: AEREH (5)

US Army Berlin
ATTN: AEBA-EN (2)

US Army Southern European Task Force
ATTN: AESE-ENG (5)

US Army Installation Support Activity,
Europe
ATTN: AEUES-RP

8th USA, Korea
ATTN: EAFE
Cdr, Fac Engr Act (8)
AFE, Yongsan Area
AFE, 2D Inf Div
AFE, Area II Spt Det
AFE, Cp Humphreys
AFE, Pusan
AFE, Taegu

DLA ATTN: DLA-WI

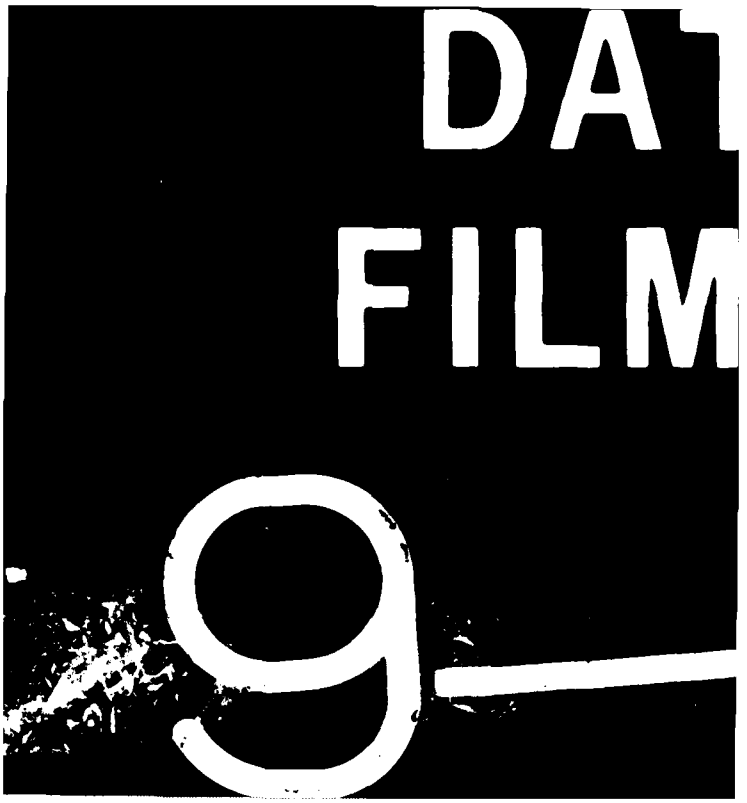
USA Japan (USARJ)
Ch, FE Div, AJEN-FE
Fac Engr (Honshu)
Fac Engr (Okinawa)

ROK/US Combined Forces Command
ATTN: EUSA-HHC-CFC/Engr

416th Engineer Command
ATTN: Facilities Engineering

Brauer, Roger L.
Methods for developing habitability design criteria. -- Champaign, IL : Construction Engineering Research Laboratory ; Springfield, VA : available from NTIS, 1980.
26 p. (Interim report ; P-111)

1. Architecture -- psychological aspects. I. Title. II. Series: U.S. Army Construction Engineering Research Laboratory. Interim report ; P-111.


DA
FILM
9