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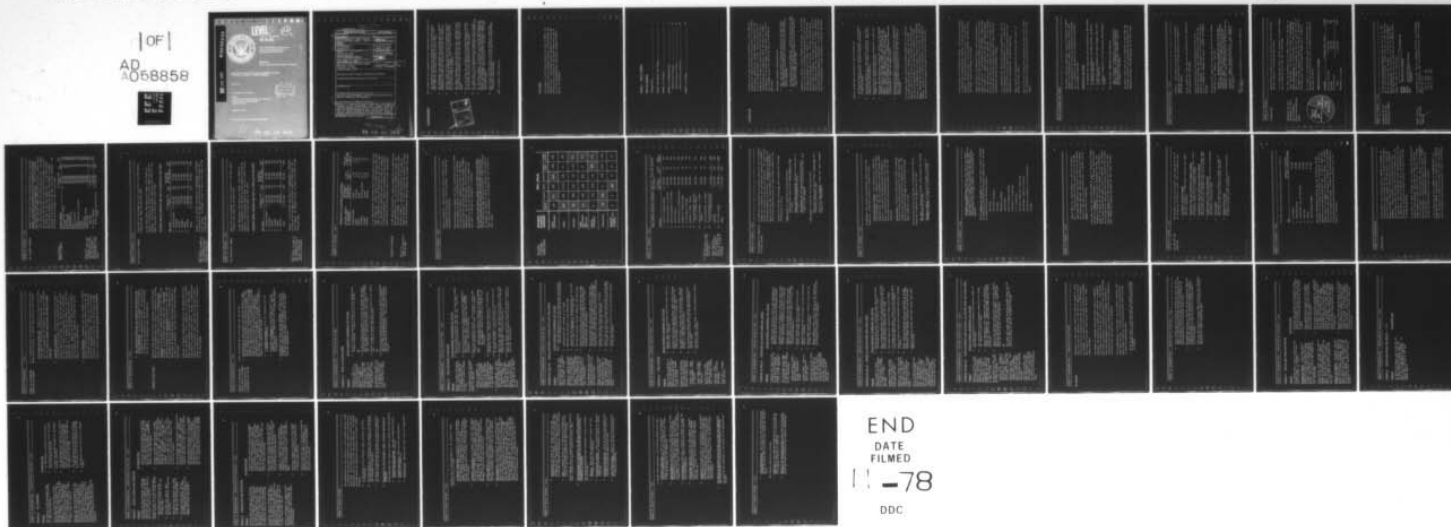
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CIVIL ENGINEERING LABORATORY
Naval Construction Battalion Center
Port Hueneque, California 93043

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REDUCING VANDALISM IN NAVAL BACHELOR ENLISTED
QUARTERS, VOLUME 1: PROJECT SUMMARY

April 1978

An Investigation Conducted by

BOSTI
THE BUFFALO ORGANIZATION FOR SOCIAL &
TECHNOLOGICAL INNOVATION
Buffalo, New York

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 19 CR-78.013	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) 6 REDUCING VANDALISM IN NAVAL BACHELOR ENLISTED QUARTERS, VOLUME I. PROJECT SUMMARY.		5. TYPE OF REPORT & PERIOD COVERED Final report April 1978
7. AUTHOR(s) 10 Christine Brady Michael Brill		8. CONTRACT OR GRANT NUMBER(s) 15 N68305-77-C-0018
9. PERFORMING ORGANIZATION NAME AND ADDRESS BOSTI 1479 Hertel Avenue Buffalo, New York 16 YF53534		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 17 YF53 534 091 01.301
11. CONTROLLING OFFICE NAME AND ADDRESS Civil Engineering Laboratory Naval Construction Battalion Center Port Hueneme, CA 93043		12. REPORT DATE 11 Apr 1978
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Naval Facilities Engineering Command 200 Stovall Street Alexandria, VA 22332		13. NUMBER OF PAGES 46
		15. SECURITY CLASS. (of this report) Unclassified 12 46p.
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) 62760N		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) BEQ Facility, BEQ Management, BEQ Planning, BEQ Construction, Vandalism Reduction, Crime Reduction		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Results of a study on the extent of vandalism in Naval BEQs are presented in three "stand-alone" volumes. Volume 1 summarizes vandalism damage which was found to be a problem of high incident rate and high maintenance cost. Volume 2 focuses on concepts for remedial programs to combat the problem. Volume 3 proposes administrative measures to deal with the problem.		

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ACKNOWLEDGEMENTS

This volume has been prepared with the immeasurable assistance of:

1. 105 Commanding Officers who completed and returned lengthy questionnaires regarding characteristics of their bases, their BEQs and the property damage on their bases.
2. 262 BEQ Managers who completed and returned equally lengthy questionnaires regarding their training and experience, management problems and the possible motives for vandalism.
3. 50 Public Works Officers and Facilities Maintenance Supervisors who carefully estimated the costs of repairing almost 30 different types of damage. (Our schedule allowed us to use only 34 of these responses.)
4. Two highly competent senior Masters-at-Arms, Commander Jerry Hollingshed and Lieutenant Ken Patullo, who made site visits at bases which otherwise would not have been studied in such depth.
5. Mr. L. W. Giles, Jr., Director of the Architectural Division at the Naval Facilities Engineering Command, Alexandria, Va., who provided design and specifications information.
6. Ms. Candy Kane of the Navy Bureau of Personnel who provided valuable assistance to BOSTI's understanding of Navy operations.
7. Mr. Ken Gray, Manager of the Physical Security R&D Program at the Civil Engineering Laboratory, Naval Construction Battalion Center, Port Hueneme, Ca., who provided continuous support for the project and made contact with all of the above. We cannot thank him enough.
8. John Zeisel and Polly Welch of Zeisel Research, Cambridge, Mass., who consulted early in the project and provided useful information about methods.

BOSTI sincerely thanks them all.

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The contents of this report reflect the views of BOSTI, its consultants, and its principal authors, Christine Brady and Michael Brill. The contents do not necessarily reflect the official views or policy of the United States Navy, nor do any of the recommendations constitute a change in NAVFAC policy or documents.

VOLUME I: PROJECT SUMMARY

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INTRODUCTION

A study of the scope and costs of vandalism in Naval BEQs has revealed that among the 99,000 sailors berthed on 130 stateside Naval bases, vandalism has reached epidemic proportions, with at least 179,000 incidents in 1976. The calculated costs of vandalism to the Navy of almost \$8 million (for 1976) are a concrete measure of vandalism's social and physical impact. Furthermore, of the total number of bases under study, 27% or only 35 bases account for 90% of the cost of vandalism on all bases.

Additional important comparisons are:

1. Well over half (57%) of the Navy-wide costs for BEQ maintenance and operations reported to us during 1976 have been spent repairing, reporting and investigating property damage due to vandalism.
2. At the current rate of vandalism, vandalism costs for FY 1978 and 1979 are equal to 48% of the total projected Navy Construction Program budget (excluding overseas and marine installations) for FY 1978 and FY 1979.

Vandalism is clearly a serious problem in the Navy. At the same time our site visits, interviews and observations for over a year with Naval personnel at all levels reveal an institution with extraordinary resources in its men. Yet this institution has severe financial problems, as do many in the society. These financial problems hinder well-meaning efforts to combat vandalism and repair property damage on many bases. We believe the effort must be maintained, for a high incidence of vandalism negatively

affects performance and morale of Navy personnel by:

1. Lowering the quality of the living environment...and through its impact on reenlistment, possibly reducing the quality of Navy personnel.
2. Diverting resources to a non-productive function...by utilizing dollars and manpower for repair, monitoring, reporting, security and investigation.
3. Generating more vandalism when left unrepaired, or when the damaged item is removed from service.
4. Reducing BEQ habitability through the removal of the damaged elements (T.V.s, furniture, carpet)...and through the low quality repairs often made by other than Public Works personnel. These "other" methods of repair include base self-help by base maintenance personnel; Comshaw; and the Captain's Mast "alternative" where an apprehended perpetrator is permitted to repair the damage himself.
5. Reducing Naval capacity to compete with civilian alternatives for skilled manpower, and by increasing turnover which, in turn, increases Naval expenditures for the cost to train a replacement.

Of the three volumes concerning property damage due to vandalism, the three-section Volume II includes a summary of the total project in the first section and in the second two sections deals with positive approaches to the reduction of vandalism in BEQs. Section 2, the Demonstration Program, focuses on the high vandalism bases, proposing four remedial programs at test sites to combat the problem. Section 3, the Design Guidelines, are proposed physical and administrative measures to deal with the most serious and

costly aspects of the vandalism problem. Statistics are provided to substantiate proposed design responses to specific vandalized elements. The Design Guidelines deal, as well, with the site design and building layout -- the environmental setting of which the highly vandalized elements are a part.

Toward the end of the vandalism study, a more limited study of theft and theft-related property damage was added to the original scope of services. It was prompted by BEQ Managers' reports that theft in BEQs is a common problem and that some property damage was in fact due to theft rather than vandalism. Thus the purpose of the add-on study was to determine the extent of losses due to theft and theft-related property damage which might effectively be addressed through environmental design.

It is estimated that losses due to theft and theft-related property damage were at least \$3,000,000 in 1977. In addition, at least one third of this could be reduced by using some of the same measures recommended for combatting vandalism.

These results and recommendations are discussed in detail in Volume IV of this report.

Each of the four volumes which constitute the entire final report are "stand-alone" documents, describing the project fully to the reader.

1

PROJECT BACKGROUND AND PURPOSE

The Volume I document summarizes a study of vandalism in Naval Bachelor Enlisted Quarters (BEQs), conducted by BOSTI (The Buffalo Organization for Social and Technological Innovation, Inc.) on behalf of the Naval Civil Engineering Laboratory, Port Hueneme, California.

PURPOSES OF THIS STUDY

1. To describe the scope and costs of vandalism in Naval BEQs.
2. To identify environmental and other factors causing or preventing vandalism.
3. To describe environmental and other changes which could reduce vandalism.
4. To design a program to test and evaluate these proposed changes.

For this project, VANDALISM is described as:

"When a person(s) intentionally or unintentionally removes, damages, or destroys government property, and where such acts and their attendant costs are unacceptable to the Navy."

The nature, extent and cost of vandalism in Naval BEQs was estimated on the basis of questionnaires completed by 105 Commanding Officers, 262 BEQ Managers and 34 Public Works

PROJECT BACKGROUND AND PURPOSE -- Cont.

Officers. These vandalism patterns and costs are described as scenarios describing which building elements were damaged in which BEQ spaces.

Design Guidelines* (both physical and administrative) addressing each scenario were developed.

Those guidelines which were believed most likely to be effective were selected, and a demonstration program to test these was designed. The remainder of this document consists of first, a SUMMARY OF FINDINGS and second, a SUMMARY OF RECOMMENDATIONS.

The entire final report for this study consists of two volumes in addition to the Summary. They are:

- . VOLUME II: DEMONSTRATION PROGRAM AND DESIGN GUIDELINES. This volume includes a detailed description of the proposed methods to reduce the cost of vandalism that we believe should be tested; recommended evaluation methods and procedures and, finally, the complete set of design guidelines.
- . VOLUME III: PROJECT METHODS AND RESULTS. This volume consists of a detailed description of the project's methods and results.

*The complete set of guidelines is in the second volume of this report.

SUMMARY OF FINDINGS

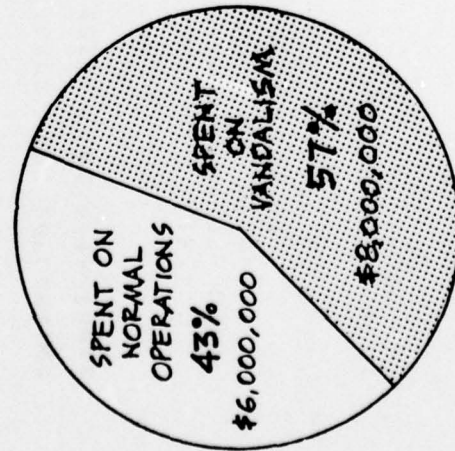
INTRODUCTION

Approximately 99,000 sailors are berthed in Bachelor Enlisted Quarters (BEQs) on 130 stateside Naval Bases.

It is estimated that almost 179,000 incidents of property damage due to vandalism occur each year in these BEQs.

VANDALISM COST AS A PERCENTAGE OF TOTAL BEQ MAINTENANCE, REPAIR AND OPERATIONS BUDGET

For 1976, the estimated cost of these incidents to the Navy is almost \$8,000,000. The estimated 1976 budget for maintenance, repair and operations of stateside BEQs is almost \$14,000,000. Thus, as is shown in the diagram to the left, over half (57%) of the budget for BEQ operations during that period is believed to have been spent repairing property damage due to vandalism.



As is shown in the table below, most of the vandalism cost is accounted for by material and labor, followed by overhead and then administration.

VANDALISM COSTS* BY CATEGORY

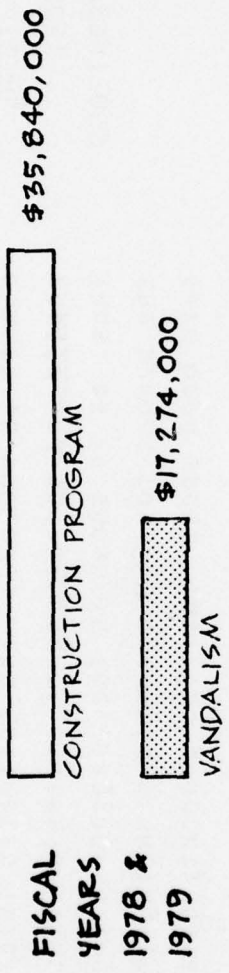
CATEGORY	ESTIMATED COST (1976)	% COST
Material and Labor	\$ 5,941,000	75%
Overhead	1,398,000	18%
Administration	585,000	7%
TOTAL	\$ 7,924,000	100%

*Figures are rounded.

SUMMARY OF FINDINGS -- Cont.

VANDALISM COST AS A PERCENTAGE OF BEQ CONSTRUCTION PROGRAM

The Navy BEQ Construction Program projected costs for FY 1978 and FY 1979 were examined. Construction for overseas bases and Marine Corps bases were excluded. If vandalism costs grow at their current rate, then vandalism costs will be 48% of the total Naval BEQ construction, modernization and rehabilitation budget for these two recent years.



TRENDS OF M & O COSTS, INCLUDING VANDALISM

As reported by over 100 base Commanding Officers, the percentage rise in maintenance, repair and operations costs (which includes vandalism) were:

1974 to 1975:	10%
1975 to 1976:	12%
1976 to 1977:	15%

SUMMARY OF FINDINGS -- Cont.

THE ELEMENTS DAMAGED

Damage to forty-seven different building elements was reported. However, the damage sustained by only five elements accounted for almost 55% of the total damage cost. These five elements are: doors and door frames (13%), ceilings (12%), window screens (11%), door hardware (10%) and vending machines (8%). The damage sustained by only fourteen of the forty-seven elements accounts for almost 90% of the total damage cost. In the table below, these fourteen elements are ranked, from highest to lowest, according to the percent of the total cost* they represent. The estimated cost of damage to each is also shown.

RANK ORDERED DAMAGED ELEMENTS

ELEMENT DAMAGED	ESTIMATED COST (1976)	% COST	CUM. %
Doors and Door Frames	\$ 932,000	13%	13%
Ceilings	843,000	12%	25%
Window Screens	801,000	11%	36%
Door Hardware	694,000	10%	46%
Vending Machines	592,000	8%	54%
Walls	492,000	7%	61%
Sofas and Chairs	369,000	5%	66%
Lights	349,000	5%	71%
Washing Machines and Dryers	259,000	4%	75%
Lockers	233,000	3%	78%
Urinals	180,000	2%	80%
Thermostats	164,000	2%	82%
Curtains and Blinds	150,000	2%	84%
Window Glass	146,000	2%	86%
SUB-TOTAL	6,204,000	86%	86%
All Other Elements	1,099,000	14%	100%
*TOTAL (Without Administrative Costs)	\$ 7,303,000	100%	

* Material, labor and overhead cost only. Administrative costs are not included. Administrative costs add \$585,000 to the total.

SUMMARY OF FINDINGS -- Cont.

THE LOCATION OF DAMAGE

Almost 60% of the damage (by cost) occurred in two BEQ spaces: sleeping rooms (38%) and hallways (20%).

In the table below, BEQ spaces are ranked, from highest to lowest, according to the percent of total damage cost each represents. The estimated annual number and cost (1976) of incidents occurring in each space is also shown.

ESTIMATED ANNUAL FREQUENCY AND COST OF VANDALISM BY BEQ SPACE

BEQ SPACE	ESTIMATED COST (1976)	% OF COST	ESTIMATED ANNUAL NO. OF INCIDENTS	% OF INC.
1. Sleeping Rooms	\$ 2,769,000	38%	57,000	32%
2. Hallways	1,443,000	20%	25,000	14%
3. Other*	978,000	13%	27,000	15%
4. Lounges	775,000	11%	21,000	12%
5. Heads	678,000	9%	37,000	21%
6. Vending	660,000	9%	11,000	6%
TOTAL	\$ 7,303,000	100%	178,000	100%

However, if you consider the amount of opportunity to vandalize, as measured by the time enlisted men spend in each space, the order changes. The change in order is shown in the table on the following page.

*BEQ spaces included in this category are: T.V. and recreation rooms, lobbies, laundries,

 SUMMARY OF FINDINGS -- Cont.

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* BEQ spaces included in this category are: T.V. and recreation rooms, lobbies, laundries, offices and grounds.

SUMMARY OF FINDINGS -- Cont.

RERANKING AS A FUNCTION OF OPPORTUNITY

ORIGINAL RANKING OF BEQ SPACES BY FREQUENCY	RERANKING OF BEQ SPACES FACTORIZING IN OPPORTUNITY	% TIME SPENT IN SPACE	RATIO OF % VANDALISM/ % TIME SPENT IN SPACE
Sleeping Rooms	Other	3.4%	4.41
Heads	Hallways	5.2%	2.69
Other*	Heads	12.1%	1.74
Hallways	Sleeping Rooms	43.1%	.74
Lounges	Lounges	19.0%	.63
Vending	Vending	17.2%	.35

It is clear from the table above that the more public spaces are "over" vandalized: "other" spaces are vandalized more than four times as frequently as would be predicted on the basis of their use; hallways are vandalized almost three times as frequently as would be predicted. Heads are considered relatively public spaces because most head damage occurs in large, common heads.

VANDALISM SCENARIOS

In the previous discussion, property damage due to vandalism has been presented by first, the elements damaged and second, the location of damage. This section addresses the question "Which building elements in which BEQ spaces should be the target of remedial measures?" In order to answer this question, the forty-seven building elements reported damaged were grouped into seven

* Other is defined on previous page.

SUMMARY OF FINDINGS -- Cont.

general categories: space enclosures, doors, windows, fixed attachments and electrical, service equipment, furnishings and bathroom fixtures/plumbing.

Then the percent of damage, (by cost), sustained by each of these building element categories in each BEQ space was calculated. The seven building element categories and the six BEQ spaces generate forty-two possible BEQ space/building element category combinations. On the following page, these combinations are displayed as a matrix, and the percent of total damage cost each "cell" of the matrix represents is indicated.

As is shown in the matrix, damage in only twelve of the forty-two cells accounts for almost 90% of the total vandalism cost. In the table on the page following the matrix, these 12 scenarios are ranked, from highest to lowest, according to the percent of total cost each represents. The estimated 1976 cost of each is also listed.

BEQ SPACE
BY BUILDING
ELEMENT MATRIX

BUILDING ELEMENT DAMAGED	BEQ SPACE						
	SLEEPING ROOMS	LOUNGES	HEADS	HALLWAYS	VENDING AREAS	OTHER SPACES	
SPACE ENCLOSURES	.1%	3%	.4%	14%	.6%	.5%	
DOORS	21%	.9%	<.1%	.6%	0	.6%	
WINDOWS	6%	.8%	.1%	1%	<.1%	5%	
FIXED ATTACHMENTS AND ELECTRICAL	2%	.5%	.3%	2%	0	4%	
SERVICE EQUIPMENT	0	.1%	.4%	1%	8%	4%	
FURNISHINGS	7%	6%	0	.5%	<.1%	.1%	
BATHROOM FIXTURES AND PLUMBING	0	0	8%	0	0	0	

SUMMARY OF FINDINGS -- Cont.

RANK ORDERED VANDALISM SCENARIOS (MATERIAL, LABOR AND OVERHEAD COSTS ONLY)				
SCENARIO	ESTIMATED COST (1976)	% TOTAL COST	CUMUL. PERCENT	
1. Doors in Sleeping Rooms	\$ 1,540,000	21%	21%	
2. Space Enclosures in Hallways	1,046,000	14%	35%	
3. Service Equipment in Vending	610,000	8%	43%	
4. Head Fixtures	591,000	8%	51%	
5. Furnishings in Sleeping Rooms	496,000	7%	58%	
6. Windows in Sleeping Rooms	470,000	6%	64%	
7. Furnishings in Lounges	420,000	6%	70%	
8. Windows in Other Spaces	342,000	5%	75%	
9. Fixed Attachments and Electrical in Other Spaces	290,000	4%	79%	
10. Service Equipment in Other Spaces	256,000	4%	83%	
11. Space Enclosures in Lounges	193,000	3%	86%	
12. Fixed Attachments and Electrical in Sleeping Rooms	177,000	2%	88%	
SUBTOTAL	6,431,000	88%	88%	
13. All Other Damage	873,000	12%	100%	
TOTAL	\$ 7,304,000*	100%		

*1. Administrative costs add \$585,000 to this total and...

2. Total material, labor and overhead cost is actually closer to \$7,303,000. The error is due to rounding.

SUMMARY OF FINDINGS -- Cont.

RELATIONSHIP OF VANDALISM
TO OTHER FACTORS

In addition to determining the nature, extent and cost of property damage due to vandalism, the relationships between environmental factors and vandalism rates were also explored. Two rates of vandalism were computed for each base: frequency of incidents and cost by base per year, both divided by number of men berthed. This allows comparison across all bases without regard to size.

Analyses of the data, using cost data, showed the following relationships to exist:

Higher costs of vandalism are associated with:

- large berthing capacity and large numbers of men on a base.
- large transient populations and high fluctuations in the number of transients at bases.
- BEQ managers who have not attended BEQ manager training school and with little experience (less than 1 year) as BEQ managers.

Lower costs of vandalism are associated with:

- Bases where C.O.s personally conduct inspections more frequently than once a year.
- Bases where host commands, rather than tenant commands conduct all inspections.

SUMMARY OF FINDINGS -- Cont.

In addition, other factors were examined, whose results are surprising. A possible rationale is offered for each:

. Berth Assignment Methods: Unit integrity as a method of berth assignment was more frequently associated with higher vandalism costs than was assignment of berths through availability. Since base size often dictates the method of berth assignment, this relationship most likely reflects the already existing relationship between base size and vandalism.

. Surveillance: Extensive surveillance of BEQs as reported by C.O.s is more often associated with bases having high vandalism cost than bases with low vandalism costs. This may be a function of the need for surveillance on bases where vandalism is high.

The following factors did not show a relationship to rates of vandalism, as measured by cost by base per year:

. Per Diem, as measured by whether authorizations were granted for per diem during 1976.

. Emergency Loading, as measured by whether initiation of "emergency loading" procedures occurred during 1976.

SUMMARY OF FINDINGS -- Cont.

- . Frequency of Inspections, whether occurring daily, weekly or less frequently. Linked to the facts that lower costs are found where C.O.s inspect more frequently and where host rather than tenant commands inspect, this may indicate that the important issue is who inspects, rather than how frequently.

Using frequency of incidents on a yearly basis by base, resulted in finding no significant relationship between high or low rates of vandalism and the following factors:

- . Base Size
- . Transient Occupancy
- . Per Diem
- . Emergency Loading
- . Surveillance
- . Berth Assignment Method
- . Frequency of Inspections
- . C.O. Inspections
- . Personnel Conducting Inspections
- . BEQ Managers Length of Training
- . BEQ Manager Attendance at Training School
- . Climate

SUMMARY OF FINDINGS -- Cont.

. Type of BEQ (i.e., Melton Beckett or rooms off corridors, etc.). Since most bases of study housed more than one BEQ type, base-wide vandalism data could not easily be attributed to a particular BEQ type. BEQ Type, measured by the predominance of a BEQ type on a particular base, in general, did not affect the rate of vandalism.

Since many factors were found linked to cost of vandalism at bases, but none to frequency of incidents, it is believed that while the frequency of vandalism occurs evenly throughout the Navy, the types of incidents and the elements damaged are very different at the bases experiencing higher costs of vandalism. And further, that the bases with high costs have special characteristics which place social stress on the BEQ occupants with the results that their respect for property decreases and their anger increases.

SUMMARY OF FINDINGS -- Cont.

THE MOTIVES FOR VANDALISM

BEQ Managers allocated the incidents they reported to one of six categories of motive or cause. The six categories are:

- 1. Accidental Property Damage
Man falls asleep in a lounge chair and burns the carpet with his cigarette.
- 2. Angry/Malicious and Intentional Property Damage
A man kicks in the face of a vending machine that "stole" his money or throws a rock through a window.
- 3. Intentional, But Not Malicious Property Damage
Men sitting around talking about their girl friends, then spray-paint their girl friends' names on the hallway wall.
- 4. Property Which Is Worn Out/Replaced
Lounge sofas "wear out" because they're poorly maintained and subject to very heavy use.
- 5. Theft Losses
Government or personal property is stolen for reuse or sale, such as pool cues or public address speakers.
- 6. Damaged During Theft
Window to a sleeping room is broken during forced entry to steal a sailor's color television.

 SUMMARY OF FINDINGS -- Cont.

The table showing incident allocation by motive or cause is:

TYPE	NUMBER OF INCIDENTS IN 1976 (Figures Rounded)
1. Accidental	43,000
2. Angry/Malicious	34,000
3. Intentional, but not Malicious	29,000
4. Worn Out	29,000
5. Stolen	27,000
6. Theft-Related Damage	27,000

Note that BEQ Managers believe that 40% (43,000 plus 29,000 incidents) of all vandalism incidents are accidental or due to materials or furnishings being worn out. In both of these categories, there is no intent to cause property damage. The project staff believes that these "motiveless" incidents can be approached in any anti-vandalism program. Therefore the proposed demonstration projects and design guidelines are applicable to all six types of vandalism.

SUMMARY OF RECOMMENDATIONS

INTRODUCTION

As described in the previous section, SUMMARY OF FINDINGS, we determined the nature, extent and cost of vandalism according to the building elements damaged and the BEQ spaces in which the damage occurred, resulting in twelve high-priority VANDALISM SCENARIOS. (These scenarios are considered high-priority because they account for almost 90% of the estimated total cost of vandalism.) Also identified were some characteristics of bases and BEQs which relate to vandalism, and it was determined that vandalism at relatively few bases accounts for most of the cost of vandalism Navywide.

On the basis of these findings, sets of design and administrative responses were developed, addressing the vandalism scenarios. (These responses are described in detail in Section 2 of Volume II of this report. They are organized, however, by the particular building elements or administrative issues they address, rather than by scenario.) A DEMONSTRATION PROGRAM was designed for testing the effectiveness of these responses.

In this particular section, SUMMARY OF RECOMMENDATIONS, the DEMONSTRATION PROGRAM recommended to be undertaken is summarized first, followed by a summary of the specific design and administrative responses that we believe warrant testing in the program.

SUMMARY OF RECOMMENDATIONS -- Cont.

SUMMARY OF RECOMMENDED
DEMONSTRATION PROGRAM

It is recommended that the demonstration program consist of four demonstration projects. A general description of each follows:

1. ANTI-VANDALISM RENOVATION: Renovation of physical facilities using specific anti-vandalism Design Guidelines. The goal here is to demonstrate the effects of, and the cost effectiveness of, physical changes specifically designed to combat vandalism.
2. INCREASED HABITABILITY: Intensive maintenance and repair to bring bases up to a quality level of habitability and to maintain them at that level. This implies that there would be few or no items on Discrepancies Lists for these bases. The goal here is to demonstrate the effects of, and the cost effectiveness of, a quality environment maintained at a quality level. None of the actions taken here are specifically designed to combat vandalism, although some may be taken to increase habitability.
3. BETTER MANAGEMENT: Management and policy changes to simultaneously increase security, increase tenant concern for the environment and the behavior of others, and to upgrade the quality of management of BEQs. The goal here is to demonstrate the effects of, and the cost effectiveness of non-physical changes specifically designed to combat vandalism.

SUMMARY OF RECOMMENDATIONS -- Cont.

4. ANTI-VANDALISM RENOVATION and INCREASED HABITABILITY and BETTER MANAGEMENT: To utilize all three of the foregoing strategies in one demonstration project. The goal here is to demonstrate the effects of, and the cost-effectiveness of all of the strategies taken simultaneously.

Potential Test Sites

Analysis shows that 35 or 27% of the bases accounted for over 90% of the estimated total cost (1976) of vandalism to the Navy. (Since this figure is based on estimates of average annual frequency of occurrence of vandalism incidents, with 1976 costs assigned, it is believed that these bases have a persistent vandalism problem which consistently accounts for the major part of property damage costs Navywide.) It is recommended that all these bases be selected for major anti-vandalism treatment or, if this is not possible, that test sites be selected from among these bases.

Selection of heavily vandalized bases for the demonstration program has two benefits. First, vandalism is a serious, recurrent, almost epidemic problem at these bases, and they afford test sites where the problem clearly exists. Second, if demonstration efforts are successful, then a major cost to the Navy is diminished in addition to the primary purpose of gaining information in the test program.

SUMMARY OF RECOMMENDATIONS -- Cont.

SUMMARY OF DESIGN AND
ADMINISTRATIVE RESPONSES
TO VANDALISM WHICH ARE
RECOMMENDED FOR TESTING

These recommendations are divided into two groups:

1. Recommendations which address the PHYSICAL DESIGN OF BEQs: BEQ programming and design, site planning, building element design, materials selections and construction methods. (It should be noted that these recommendations generally are not written as specifications. They are presented in performance terms and require translation into specifications or designs. These would then be used for selection of commercially available products to be tested, for the development of new products or for consideration as elements in design.) Most of these recommendations are organized by the vandalism scenario they address and include:
 - a. A problem statement in which the frequency and cost of damage is described.
 - b. Alternative responses to the problem, which, in our judgement, are potentially most effective. (Each of these responses is identified as to the specific issue(s) it addresses.)
2. Recommendations which address PROGRAMS: BEQ Policy and Management, BEQ Staff and BEQ Maintenance. These are for vandalism incidents for which no feasible physical design or target hardening strategy is available, or for which they are inappropriate.

SUMMARY OF RECOMMENDATIONS -- PHYSICAL DESIGN OF BEQS

SCENARIO #1: DOORS IN SLEEPING ROOMS

PROBLEM

Damage to doors in sleeping rooms is the single most pervasive and costly type of damage. Damage to doors in sleeping rooms accounts for about 21% of the cost of all damage in BEQs, and for approximately 80% of all door damage in BEQs.

An estimated 15,200 incidents occur annually, at an estimated 1976 cost of \$1,540,000 or about 21% of the total damage cost.

DESIGN RESPONSES RECOMMENDED FOR TESTING

- 1.1 Install sleeping room doors which will not be damaged when kicked or punched. (*Material Selection, Door Design*)
- OR
- 1.2 Install sleeping room doors on which any damage sustained by kicking and punching is a) of low visibility and thereby does not make the door appear shabby, and b) does not affect door functions. (*Material Selection, Door Design*)
- 1.3 Install cipher or punch-code door locks which do not require keys. (*Hardware Design, BEQ Management*)
- OR
- 1.4 Alter keying procedures and controls to provide a convenient way for doors to be opened by a neutral party (custodial, security, BEQ management staff) at all times when personal keys have been lost or mislaid. (*BEQ Management, Hardware Design*)

SUMMARY OF RECOMMENDATIONS -- PHYSICAL DESIGN OF BEQs -- Cont.

SCENARIO #2: SPACE ENCLOSURES IN HALLWAYS

PROBLEM

Damage to space enclosures (walls, ceilings and doors) in hallways accounted for an estimated 14% of the cost of all property damage in 1976.

An estimated 9,100 incidents occurred, costing approximately \$1,046,000.

1. Hallway CEILINGS: An estimated \$801,000 was spent repairing damage sustained in approximately 2,500 incidents. Damage to hallway ceilings accounted for 95% of the cost of damage to all BEQ ceilings.

2. Hallway WALLS: An estimated \$239,000 was spent repairing damage sustained in approximately 5,400 incidents. Damage to hallway walls accounted for almost 50% of the cost of all wall damage. Damage to hallway floors was negligible, accounting for only 6% of all floor damage.

DESIGN RESPONSES RECOMMENDED FOR TESTING

2.1 Make ceilings of material that will not break when punched or hit with broomsticks, pool cues, etc. (*Material Selection*)

2.2 Specify ceiling materials whose surface and composition are a homogenous color throughout so that a damaged surface will not expose another color that attracts attention. (*Material Selection*)

2.3 Don't use suspended ceiling. Leave conduit, piping and ductwork exposed and color code. (*Building Design*)

NOTE: Seven possible design responses to ceiling damage were developed and are included in Section 2. In our judgement, these three are most likely to be effective.

2.4 Construct walls of materials which will not break when punched or kicked. (*Material Selection*)

2.5 Do not use wallpaper or any other wall covering which can be ripped off walls. (*Material Selection*)

2.6 Specify wall coverings from which scuff marks, crayon, pen, magic marker and pencil can easily be removed by ordinary cleaning methods. (*Material Selection*)

2.7 Have maintenance staff keep quick-drying touch-up paint in stock and repair and paint as soon as possible. (*Material Selection, Maintenance*)

SUMMARY OF RECOMMENDATIONS -- PHYSICAL DESIGN OF BEQS -- Cont.

SCENARIOS #3 AND #10: SERVICE EQUIPMENT IN VENDING AREAS AND OTHER SPACES

PROBLEM

An estimated 16,000 incidents accounted for about 16% of the cost of property damage in BEQs in 1976.

Damage to vending machines was about 8,000 incidents at a cost of \$592,000 (61% of all service equipment damage). Damage to washers and dryers represented 27% of the cost of all service equipment damage, with almost 4,000 incidents at a cost of \$259,000.

Most damage occurred in areas especially designated for vending machine use, or in the laundry rooms.

Damage to machines usually occurs when attempts are made to release snacks from balking machines, or to get refunds or change. Washer and dryer damage usually occurs through misuse or attempted repairs.

DESIGN RESPONSES RECOMMENDED FOR TESTING

NOTE: Most BEQ Managers are of the opinion that most vending machine damage occurs because the machine malfunctions.

1. Keep machines well stocked at all times.
2. Maintain the machines in good working order.
3. Centralize the location of vending machines so that they are in sight of passers-by or the front desk.
4. Provide for 24-hour, instant refund at the front desk.
5. Construct protective covers on vending machine islands which restrict movement of machines or any other kind of tampering but which permit access to coin slots, selector buttons and purchases.
6. Only those machines which have been proven sturdy and reliable under the expected volume of use in BEQs should be installed. Vendors who include a preventive maintenance service for their machines should be given preference.
7. Washers and dryers should be heavy duty reliable machines with simply operated controls.
8. Install one or two extra washers and dryers so users need not attempt amateur repairs but may use alternate machines.
9. Centralize laundry facilities and have attendant present during peak periods.

SUMMARY OF RECOMMENDATIONS -- PHYSICAL DESIGN OF BEQs -- Cont.

SCENARIO #4: HEAD FIXTURES

PROBLEM

About 33,000 incidents of damage to bathroom elements and fixtures accounted for about 8% of the cost of property damage in BEQs in 1976.

Damage to the following five items accounts for 76% of the total cost of bathroom fixture damage:

- . Urinals (30%): Most often clogged, broken or removed.
- . Toilet paper holders (15%): Often ripped from walls.
- . Shower heads (12%): Usually accidentally damaged during normal use; sometimes stolen.
- . Partitions (10%): Torn down, scratched and dented.
- . Sinks (9%): Clogged, torn off wall.

DESIGN RESPONSES RECOMMENDED FOR TESTING

1. Replace paper towel dispensers with cloth towel rolls to reduce urinal clogging.
2. Install high quality durable shower heads which minimize need for individual adjustments in water pressure, but allow some change in direction of water flow.
3. For paper holders, shower heads and partitions, specify methods of attachment which can resist maximum pulling forces of a 95th percentile male.
4. For urinals and shower heads, design new hardware which resists clogging or which cannot be removed without special tools.
5. Eliminate large, common heads to reduce damage to urinals, and toilet paper holders.

SUMMARY OF RECOMMENDATIONS -- PHYSICAL DESIGN OF BEQs -- Cont.

SCENARIOS #5 AND #7: FURNISHINGS IN SLEEPING ROOMS AND LOUNGES

PROBLEM

Slightly more than 31,000 incidents accounted for 13% of the cost of property damage in BEQs in 1976 at a cost of over \$960,000.

The following three items accounted for almost 80% of the total cost of damage to all furnishings:

- . Sofas and Chairs (38%): Most often damaged during normal use, or broken, slashed or burned.
- . Lockers (24%): Usually pried open because keys are lost.
- . Curtains and Blinds (16%): This damage occurs in sleeping rooms 97% of the time, when curtain rods are pulled down when curtains are being opened or closed. Venetian blinds tend to break even when properly operated.

DESIGN RESPONSES RECOMMENDED FOR TESTING

1. Purchase sofas and chairs with as few components as possible whose joints will not weaken with age and which may be easily repaired by maintenance staff.
2. Purchase an extra inventory of sofas and chairs with modular cushions or removable or zip-off covers for instant replacement in case of burning or slashing.
3. Design lockers that cannot be pried open even with special tools or assistance so that seeking someone with a master key to open the lockers is a less time-consuming alternative.
4. Design lockers with built-in combination or push-button locks rather than key locks.
5. Replace venetian blinds with heavy, durable decorative shades or shutters.
6. Ensure that curtain rods are correctly installed and screwed into firm backings.
7. Choose hardware which allows curtains to be opened and closed with very little force and which will not jam over the expected lifetime of the hardware.

SUMMARY OF RECOMMENDATIONS -- PHYSICAL DESIGN OF BEQS -- Cont.

SCENARIOS #6 and #8: WINDOWS IN SLEEPING ROOMS AND OTHER SPACES

PROBLEM

About 25,000 incidents accounted for an estimated 13% of the cost of property damage in BEQs in 1976, at a cost of almost \$951,000.

Damage to window screens accounted for 84% of the total cost, and glass breakage about 15%.

Damage to screens occurred most often in the sleeping rooms (93% of the time), sometimes from hasty attempts to discard marijuana or other illegal drugs.

Glass in public spaces may be broken by billiard balls, hockey pucks or other recreational activities. Breakage in rooms most often results from malicious actions or "horsing around". Jalousie windows seem particularly susceptible to damage, perhaps because of their complexity and fragility.

DESIGN RESPONSES RECOMMENDED FOR TESTING

1. Develop screens with a sub-frame, with the screen panel top-hinged to pop out or swing out at a touch.
2. Use a screening material with high elasticity, which will deflect during hard contact and then return to its original shape without tearing from its frame.
3. Use heavy duty wire screens with heavy duty frames.
4. In lounges and game rooms, install 5.3 mm tempered glass which resists most full body or projective impacts.
5. Install Lexan or other poly-carbonate materials instead of glass.
6. Where outside recreation areas are adjacent to glazed areas, consider erection of chain link fencing or other decorative screen between recreation area and glazing.
7. Replace jalousie windows with other window types when damage occurs.

SUMMARY OF RECOMMENDATIONS -- PHYSICAL DESIGN OF BEQS -- Cont.

SCENARIOS #9 AND #12: FIXED ATTACHMENTS AND ELECTRICAL IN SLEEPING ROOMS AND OTHER SPACES

PROBLEM

Damage to lights, wires and conduits, switches, outlets, thermostats, speakers, exit lights, fire alarms, sprinkler heads and air vents accounted for about 9% (\$686,000) of the cost of all property damage in BEQs in 1976.

On the basis of cost, the elements of major concern are the following:

- . Lights (50%): Damage is most often in stairways and hallways, where bulbs, globes and covers are broken or ripped out.
- . Thermostats (24%): Most often kicked loose, ripped off or tampered with in sleeping rooms possibly due to frustration with malfunctioning equipment.
- . Sprinkler Systems (15%): Lawn sprinklers rather than interior fire sprinkler systems, often broken or stolen, possibly for sale or use in residential lawns.

DESIGN RESPONSES RECOMMENDED FOR TESTING

1. Re-lamp continuously to counter the negative effect of dark hallways.
2. Use unbreakable or polycarbonate materials for globes and lenses in critical areas.
3. Remove thermostats from sleeping rooms and centralize control of temperature. Temperature must be maintained within the comfort zone commensurate with energy saving practices.
4. Specify lawn sprinkler heads which require either special tools or a great deal of time to remove. (A number of manufacturers make what they refer to as "vandal-proof" heads and these should be investigated.)

OR

Use fewer and larger heads covering greater areas of lawn (such as those used for golf courses) which cannot be easily utilized in smaller residential systems.

SUMMARY OF RECOMMENDATIONS -- ADMINISTRATIVE GUIDELINES

Background

Experience in other studies shows that physical damage to buildings, malicious or otherwise, is a function of both the quality of the physical environment itself and how it is administered and managed. This section deals with administrative and management issues at the base level and at higher decision levels within the Navy.

The summary of findings shows that higher costs of vandalism Navywide, and especially at bases where vandalism is epidemic, are linked to factors which are social in nature. Large bases with high fluctuations in transient populations and with untrained, short-term BEQ managers and with little Command attention to inspections and where tenant commands make their own inspections are bases with very high costs in vandalism.

The recommendations, while clear, are not always consonant with other Naval policies. In terms of the social structure which would reduce vandalism, and disregarding other Naval policies, it would be recommended that:

1. Bases be kept small or designed small and methods be explored to fragment existing bases into smaller, more cohesive social structures.

SUMMARY OF RECOMMENDATIONS -- ADMINISTRATIVE GUIDELINES -- Cont.

2. Every attempt should be made to minimize the size and frequency of movement of transient populations from base to base and/or serious attention be paid to the development of an effective social structure which could be established for these populations in a relatively short time.
3. BEQ Managers be seen as critical to the successful operation of BEQs, and that the current training program be accelerated and mandatory, and the tenure of managers increased. Exploration might be given to the use of professional, civilian managers.
4. C.O.s be instructed to inspect BEQs personally and frequently and that host command personnel take all responsibility for inspection of tenant command quarters.

SUMMARY OF RECOMMENDATIONS -- ADMINISTRATIVE GUIDELINES -- Cont.

PROBLEM A: REPAIRS AND PAYING FOR REPAIRS

PROBLEM

The damage/repair cycle is beset by two problem areas: a) methods of repair and b) payment for repairs.

Methods of Repair: Many bases permit identified vandals to make repairs themselves as an alternative to going to mast. Shoddy work results, perpetuating the effects of lowered habitability. This is not a major problem since fewer than 5% of the vandals are ever apprehended.

Public Works' repair charges are seen as expensive and slow, and this repair method is bypassed whenever possible. Public Works has been known to "save up" repair work until it is worth their effort to make the repairs, resulting in a prolonged period of reduced habitability.

Methods of Payment: Currently, the host command pays for all vandalism investigations and repairs, including repairs on behalf of its tenant commands. When the tenant admits or assumes responsibility, they write a check to the Treasury, not to the host command. The result is less incentive for host commands to perform repairs.

RECOMMENDATIONS

1. The Navy must explore an alternative fiscal mechanism whereby the host command can receive funds from tenant commands to cover the costs of repairs to property damaged by the tenant command.
2. Known perpetrators should pay for repairs performed by Public Works or a qualified local contractor, rather than have repairs made by the perpetrator.
3. Public Works policies, procedures, scheduling and charges should be examined so that they may be more closely coordinated with the actual needs and budgets of the bases. Simultaneously, C.O.s and their budget preparation staff must clearly understand the cost of vandalism on their bases and budget accordingly. This implies a change in the central Naval budget review process and an increase in M & O funds for bases, especially those experiencing an epidemic of vandalism.
4. Develop a financial system which facilitates timely repair of property damage at bases, so as to minimize requests to MCON for a "saved-up" volume of individual property damage incidents. This implies placing a higher priority on minor construction and alteration projects directly affecting habitability.

SUMMARY OF RECOMMENDATIONS -- ADMINISTRATIVE GUIDELINES -- Cont.

PROBLEM A: REPAIRS AND PAYING FOR REPAIRS -- Cont.

PROBLEM

In 23% of all bases, and in 54% of the 28 most vandalized bases, the costs of vandalism were greater than, or equal to, the entire M & O budget. In many cases, there were simply not enough funds to pay for all the needed repairs.

RECOMMENDATIONS

SUMMARY OF RECOMMENDATIONS -- ADMINISTRATIVE GUIDELINES -- Cont.

PROBLEM B: BEQ MANAGEMENT

PROBLEM

Two aspects of BEQ management make for more difficulties in preventing or repairing vandalism.

First, the qualifications of most BEQ managers are not sufficient to perform the job effectively. 73% of the BEQ Managers have not been to BEQ Managers' School. Managers who are untrained or hold an inappropriate rating for the job often have difficulty in establishing rapport with the men, a situation which is linked to higher rates of vandalism.

Second, the job requirements of the BEQ Manager often conflict with the desired aim of reducing vandalism. The position is often temporary, a condition which offers little opportunity to develop pride in the job or to establish a relationship with the tenants. Managers sometimes are overloaded, holding the positions of BEQ Manager, Base MAA, Base Housing Officer and Career Counselor simultaneously.

RECOMMENDATIONS

1. All BEQ Managers attend Training School.
2. BEQ Managers be permanent staff and permanently assigned that job.
3. A staff serving BEQ Managers be developed whenever possible.
4. That BEQ Managers be involved in a planning and monitoring effort with security personnel, purchasing, patrols, responsible senior petty officers and all other parties whose actions affect that habitability and security of the BEQs.
5. That BEQ Managers be rewarded for running a tight BEQ, maintaining records and being up-to-date on all issues affecting the BEQ.
6. A BEQ Manager should receive full command support.

SUMMARY OF RECOMMENDATIONS -- ADMINISTRATIVE GUIDELINES -- Cont.

PROBLEM C: SECURITY PATROLS AND INSPECTION

PROBLEM

Although the data analyses showed no correlation between levels of surveillance and rates of vandalism, 40% of the C.O.s felt that increased security would help reduce vandalism.

Accepting the C.O.'s first-hand experience, certain critical issues follow:

1. Many BEQs have several entry points, most of which do not pass the duty desk.
2. Fire doors are used as entry points by many sailors, by-passing any control.
3. Desk watch and patrols are insufficient at many bases, especially in the evening and night-time.
4. The regulations about initial occupancy inspections are often not followed, which results in the party responsible for property damage not being determined.

RECOMMENDATIONS

1. Secure as many entry points as possible. Fire doors should be equipped with alarm or signal devices cueing the desk as to which door has been opened. A single entry, past the duty desk (manned at all times) is highly desirable.
2. Prevent unauthorized personnel in BEQs through use of a BEQ resident card, presented to the desk. This card should have the holder's name, rate, SSN, unit, BEQ number and room number. Guests must sign in and be "sponsored" by a known BEQ resident. *(Project staff comment: This would be useful for theft, but less so for vandalism, which is most often committed by people with legitimate access to the spaces they damage.)*
3. Provide 24-hour desk watch and roving patrols on a continuous tour of duty. Special attention from 1600 to 0600. Senior petty officers and duty officers should be used whenever possible for desk watch and patrols.
4. Enforce regulations about initial occupancy and check-out inspections in company with the BEQ Manager. A furniture marking/stencilling program keying each piece of furniture to a space, coupled with signing for the furniture, would facilitate assignment of responsibility for property damage.

SUMMARY OF RECOMMENDATIONS -- ADMINISTRATIVE GUIDELINES -- Cont.

PROBLEM D: COMMUNICATION AND ORIENTATION

PROBLEM

Communication between the enlisted men and the base management may fail in either direction. In many bases, BEQ Advisory Committees are poorly run and essentially useless. These Committees or Tenant Councils have the potential to be of real utility in reducing vandalism by providing an effective voice for enlisted men.

Conversely, many enlisted men are unaware of efforts to upgrade habitability and maintain a quality environment through extensive construction, modernization, and other efforts. Attempts to communicate these efforts to let the men know that the base is "trying" have often failed.

Initial orientation of newly arrived personnel is often incomplete, not informing them of their rights and responsibilities involving the physical environment.

RECOMMENDATIONS

1. Establish BEQ Councils with strong Command support and reward but minimal direction from Command. These Councils should be concerned with habitability, tenant gripes, security, inspection, sanitation, management policy and style and any other issues they can handle competently. Councils might have a monthly newsletter to describe actions taken and pending.
2. Base newspapers should describe the efforts being made to increase habitability (both recent accomplishments and current plans) and simultaneously document incidents of vandalism which decrease habitability.
3. Attempt to standardize BEQ regulations (smoking in rooms, restitution procedures, redecoration of rooms, etc.) so that personnel moving from base to base have some general understanding of what is expected of them.
4. Prominent signage in high use areas should state major BEQ regulations in a way that reinforces the concept of habitability as a shared responsibility.
5. Develop materials for a 15-minute orientation program about the BEQ's regulations. It should be presented by the BEQ Manager to each newly arrived person to establish a personal relationship.

SUMMARY OF PROJECT METHODS

The methodology for this project is a multi-method approach aimed at defining and refining relevant issues related to vandalism in Naval BEQs. While many methods are described, certain ones were emphasized, such as site visits and questionnaires. The methods described below are organized according to the project's major concerns:

- A. A description of the frequency types, patterns and costs of vandalism;
- B. The development of 1) guidelines for design of new construction and renovation of quarters and 2) guidelines for policy and management of quarters;
- C. The design of demonstration projects to test the feasibility and effectiveness of the design and management guidelines.

A. Description of the Frequency, Types, Patterns and Costs of Vandalism

Three questions were asked in order to obtain this description:

1. Perspective and typology: How could vandalism be most usefully defined for this project?
2. Problem Definition: What are the characteristic patterns of vandalism?
3. Problem Costs: What are the "real" costs of vandalism?

SUMMARY OF PROJECT METHODS -- Cont.

Methods used in the development of the answers to these questions are as follows:

1. Literature Searching is analysis of existing documents to extract from them information useful to this project. These documents included analyses of fifteen months of property damage reports from one Naval Base, and NIS reports. Also, previous research and evaluation studies of vandalism in a variety of different settings were reviewed.
2. Informant Interviews are in-depth interviews with people who are knowledgeable about all aspects of a situation of concern. For this project the people who were interviewed included: academic experts on vandalism, Naval Personnel of the Research and Development Laboratory, BEQ Managers and staff, Executive officers, Public Works Managers, Security Officers and sailors.
3. Content Analysis is systematically interpreting records by focusing on particular aspects of the document. This analysis included property damage reports, maintenance and repair records, discrepancy lists and NIS reports.
4. Questionnaires, the backbone of the quantitative part of the project, are sets of highly structured questions which a variety of Naval Personnel were asked to fill out about those areas in which they were most knowledgeable. 105 C.O. questionnaires were completed which included base-specific information about the BEQs, types, and costs of vandalism and maintenance and repair budgets. BEQ Manager questionnaires, in all 262, provided information on management policy, the motives for vandalism and methods of prevention. Information obtained from Public Works Managers, in all 34, included cost data for a variety of vandalism incidents.

SUMMARY OF PROJECT METHODS -- Cont.

5. Site Visits were made by the project staff and two Masters-at-Arms to 14 bases. Aside from interview data, patterns of use were observed to assess the present level of habitability. Documentation of vandalism and habitability was recorded by photographs, subsequently analyzed.
6. SPSS, a computer based set of Statistical Programs for the Social Sciences, aided in the tabulation and manipulation of the large quantities of data collected.

These methods led to a complete description of the frequency, types, patterns and costs of vandalism in Naval BEQs.

B. The Development of Guidelines for Design of New Construction and Renovation of Quarters and Guidelines for Policy and Management of Quarters.

The following questions were addressed in order to produce the guidelines:

1. Motives: What are the psycho-social reasons for the different patterns of vandalism?
2. Environmental Factors: What characteristics of the environment, or of policy and management promote or reduce vandalism?
3. Designed intervention: Which of these environmental and management factors are manipulable, and what would be feasible and effective ways to do this?
4. Cost Effectiveness: Which of these manipulable environmental and management factors are most cost-effective in reducing vandalism?

SUMMARY OF PROJECT METHODS -- Cont.

To answer these questions, the following methods were used:

1. Informant Interviews, as well as aiding in the description of vandalism patterns, were an important initial method of collecting information relevant to all issues in the development of the guidelines.
2. Questionnaires provided several important sources of data. BEQ managers provided data on motives which could be ranked by the occurrence of incidents for each motive on a yearly basis. Both BEQ Managers and C.O.s provided suggestions to combat vandalism which were content analyzed.
3. Rank Ordering of the major vandalism incidents by cost led to the development of design guidelines which would be most cost-effective.
4. Statistical Analysis, using the SPSS computer programs, allowed for the examination of relationships between rates of vandalism and environmental factors such as base size, climate, rate of inspections, BEQ manager training, etc.
5. Expertise of project staff in architecture, site planning, product design and selection, environmental design and management policy was used in developing the guidelines and in selecting those strategies which have least cost, most probable effectiveness, or both. No formal cost-effectiveness was done because of lack of data on actual effectiveness.

C. The Design of Demonstration Projects to test the feasibility and Effectiveness of the Design and Management Guidelines

One question was addressed in the design of the demonstration program:

SUMMARY OF PROJECT METHODS -- Cont.

1. Test Demonstration: How could the top-ranked Design and Management Guidelines be tested in a limited but reliable way to ascertain their utility before extensive utilization?

The methods used were as follows:

1. Selection of the proposed demonstration sites based on where the present rate of vandalism is high and on the most costly incidents of vandalism.
2. Choice of an Evaluation Design which would be the most reliable way to ascertain the utility of the Guidelines based upon sound evaluation and research methodology.