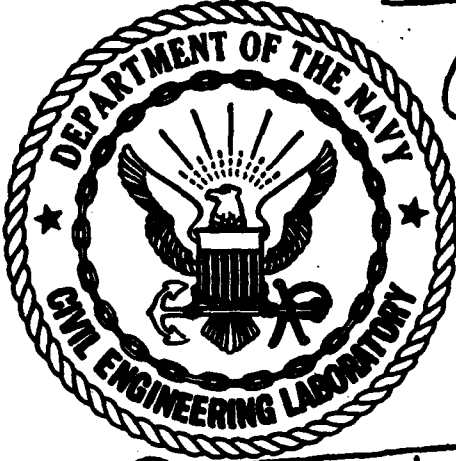


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CIVIL ENGINEERING LABORATORY  
Naval Construction Battalion Center  
Port Hueneme, California 93043

Sponsored by  
NAVAL FACILITIES ENGINEERING COMMAND

10 Christine Brady Michael Brill

6 REDUCING VANDALISM IN NAVAL BACHELOR ENLISTED  
QUARTERS, VOLUME II: DEMONSTRATION PROGRAM &  
DESIGN GUIDELINES. (and)

11 Apr 78

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12 164 p.

An Investigation Conducted by

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

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FILED

15 N68305-77-C-0018

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UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

| REPORT DOCUMENTATION PAGE  |                       | READ INSTRUCTIONS<br>BEFORE COMPLETING FORM   |
|--|-----------------------|---|
| 1. REPORT NUMBER<br>CR 78,016  | 2. GOVT ACCESSION NO. | 3. RECIPIENT'S CATALOG NUMBER   |
| 4. TITLE (and Subtitle)<br>REDUCING VANDALISM IN NAVAL BACHELOR<br>ENLISTED QUARTERS, VOLUME II: DEMON-<br>STRATION & DESIGN GUIDELINES  |                       | 5. TYPE OF REPORT & PERIOD COVERED<br>Final<br>April 1978                             |
|  |                       | 6. PERFORMING ORG. REPORT NUMBER  |
| 7. AUTHOR(s)<br>Christine Brady<br>Michael Brill   |                       | 8. CONTRACT OR GRANT NUMBER(s)<br>N68305-77-C-0018                                    |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS<br>BOSTI<br>1479 Hertel Avenue<br>Buffalo, NY  |                       | 10. PROGRAM ELEMENT, PROJECT, TASK<br>AREA & WORK UNIT NUMBERS<br>YF53.534.091.01.301 |
| 11. CONTROLLING OFFICE NAME AND ADDRESS<br>Civil Engineering Laboratory<br>Naval Construction Battalion Center<br>Port Hueneme, CA 93043   |                       | 12. REPORT DATE<br>April 1978   |
| 14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)<br>Naval Facilities Engineering Command<br>200 Stovall Street<br>Alexandria, VA 22332  |                       | 13. NUMBER OF PAGES<br>162  |
|  |                       | 15. SECURITY CLASS. (of this report)<br>Unclassified                                  |
| 16. DISTRIBUTION STATEMENT (of this Report)<br><br>Approved for public release; distribution unlimited.  |                       | 15a. DECLASSIFICATION/DOWNGRADING<br>SCHEDULE   |
| 17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)   |                       |   |
| 18. SUPPLEMENTARY NOTES  |                       |   |
| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number)<br>BEQ Facility, BEQ Management, BEQ Planning, BEQ Construction,<br>Vandalism Reduction, Crime Reduction  |                       |   |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>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.

DISCLAIMER

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 II: DEMONSTRATION PROGRAM AND DESIGN GUIDELINES

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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 "alternatives" 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.

## 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

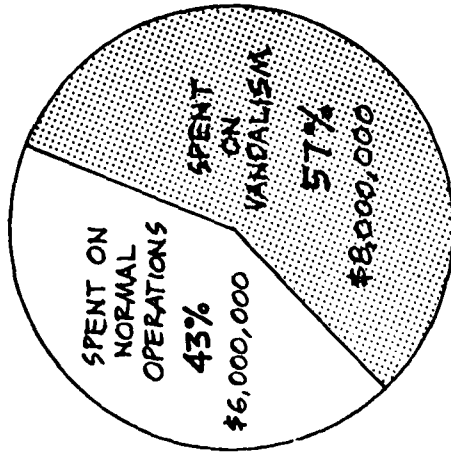
INTRODUCTION

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

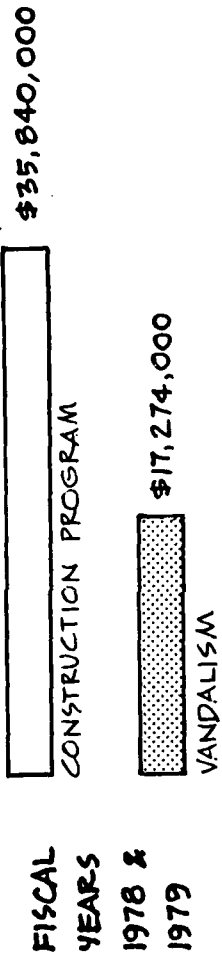
| CATEGORY           | ESTIMATED COST (1976) | % COST      |
|--------------------|-----------------------|-------------|
| Material and Labor | \$ 5,941,000          | 75%         |
| Overhead           | 1,398,000             | 18%         |
| Administration     | 585,000               | 7%       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

\*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<br>(1976) | % OF<br>COST | ESTIMATED<br>ANNUAL NO.<br>OF INCIDENTS | % OF<br>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, offices and grounds.

SUMMARY OF FINDINGS -- Cont.

| ORIGINAL RANKING<br>OF BEQ SPACES<br>BY FREQUENCY | RERANKING OF<br>BEQ SPACES<br>FACTORING IN<br>OPPORTUNITY | % TIME<br>SPENT IN<br>SPACE | RATIO OF<br>% VANDALISM/<br>% TIME SPENT<br>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.



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SUMMARY OF FINDINGS -- Cont.

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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.

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SUMMARY OF FINDINGS -- Cont.

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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.

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SUMMARY OF FINDINGS -- Cont.

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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.

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 SUMMARY OF FINDINGS -- Cont.
 

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. 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

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SUMMARY OF FINDINGS -- Cont.

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. Type of BEQ (i.e., Welton 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.

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SUMMARY OF FINDINGS -- Cont.

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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.



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 SUMMARY OF FINDINGS -- Cont.
 

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The table showing incident allocation by motive or cause is:

| TYPE                              | NUMBER OF INCIDENTS<br>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.

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## 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.

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SUMMARY OF RECOMMENDATIONS -- Cont.

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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.

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SUMMARY OF RECOMMENDATIONS -- Cont.

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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*)

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

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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.

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SUMMARY OF RECOMMENDATIONS -- ADMINISTRATIVE GUIDELINES

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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.

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SUMMARY OF RECOMMENDATIONS -- ADMINISTRATIVE GUIDELINES -- Cont.

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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 investigation 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.

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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 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.

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## SUMMARY OF PROJECT METHODS

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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?

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SUMMARY OF PROJECT METHODS -- Cont.

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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.

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SUMMARY OF PROJECT METHODS -- Cont.

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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:

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SUMMARY OF PROJECT METHODS -- Cont.

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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.



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## DEMONSTRATION PROGRAM

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### INTRODUCTION

In Section 3 of this report, entitled DESIGN GUIDELINES, those changes in BEQ policy, management, maintenance and design which have the potential for reducing the cost of vandalism in BEQs are described.

In this section, Section 2: DEMONSTRATION PROGRAM, a recommended program for determining the extent to which these changes actually reduce the cost of vandalism is described. This program description addresses three major concerns:

1. Where should the recommended changes be tested?  
(*POTENTIAL TEST SITES*)
2. What types of changes should be instituted?  
(*RECOMMENDED DEMONSTRATION PROJECTS*)
3. How should these changes be instituted and evaluated?  
(*RECOMMENDED EVALUATION METHODOLOGY*)

The following discussion consists of a general description of the potential test sites, followed by summaries of both the recommended demonstration projects and the recommended evaluation methodology. Then the demonstration projects and the evaluation methodology are then described in more detail.\*

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\* A detailed description of potential test sites is specifically excluded because the final selection of particular sites is a task which should be undertaken only after the Navy's decision about the scope of the demonstration program has been made.

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DEMONSTRATION PROGRAM -- Cont.

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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 Recommended  
Demonstration Projects

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

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DEMONSTRATION PROGRAM -- Cont.

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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.
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.

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DEMONSTRATION PROGRAM -- Cont.

Summary of Recommended  
Evaluation Methodology

The recommended evaluation methodology is a "time-series" design where detailed baseline data regarding the incidence and cost of vandalism in each BEQ at each test site is developed before the demonstration project changes are initiated; then the data-gathering continues after the changes are complete.\* Finally, the "before" and "after" data are compared to determine the effectiveness of the changes.

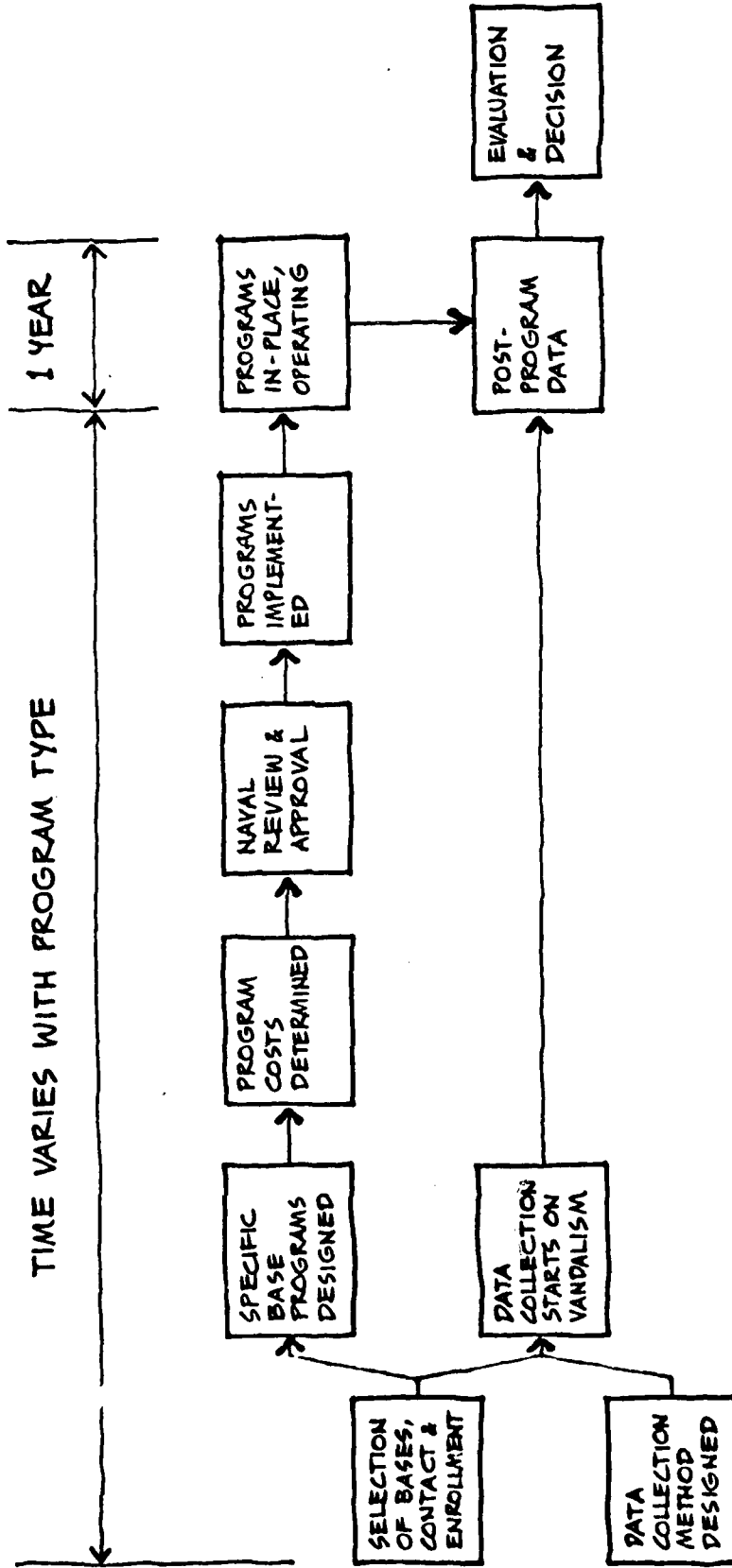
This particular methodology is strongly recommended as it avoids the numerous problems encountered when evaluations are based on the comparison of two groups. Also, the methodology should provide enough data, regarding the comparative effectiveness and cost-effectiveness of the four strategies embodied in the four demonstration projects, to guide future decisions about which strategy to select in combatting vandalism.

The chart on page 45 diagrams, in gross terms, the tasks that must be performed in all the demonstration projects. The time frame for each will vary, but a minimum effort project is assumed to take 2 years from its initiation to final evaluation.

\*It is recommended that accurate, on-going property damage record-keeping be instituted a) Navy-wide or b) at least on the demonstration sites and a sample of non-demonstration sites. This helps maintain the validity of the evaluation, as discussed in detail on pages 74-75.

DEMONSTRATION PROGRAM -- Cont.

Following the diagram are the more detailed discussions of the demonstration projects and the evaluation methodology which were previously mentioned.



# GROSS TASK MODEL FOR ALL 4 DEMONSTRATION PROGRAMS

DEMONSTRATION PROGRAM -- RECOMMENDED DEMONSTRATION PROJECTS

It is recommended that the demonstration program consist of four demonstration projects:

1. ANTI-VANDALISM RENOVATION: *Testing Physical Changes Specifically Designed to Combat Vandalism*

1. ANTI-VANDALISM RENOVATION
  2. INCREASED HABITABILITY
  3. BETTER MANAGEMENT
  4. ANTI-VANDALISM RENOVATION and INCREASED HABITABILITY and BETTER MANAGEMENT
- Approximately 7 to 10 high vandalism bases should be selected for this project. Through review of current base records, site visits and interviews, a selection of a set of physical Design Guidelines should be made which would constitute an appropriate fit between the patterns and costs of vandalism on that base and the Guidelines to be implemented. The Guidelines to be used are presented in this volume.

Data on each base already exists within this project to develop reasonably accurate preliminary packages of appropriate guidelines for each selected base. Many costs for renovation/repair are already known, and cost estimates can readily be made for any set of proposed changes.

While some pre-program cost-effectiveness analysis should be done, it is not entirely appropriate to make decisions based on costs of vandalism versus costs of the program. Other considerations, such as the impact of lowered habitability on re-enlistment rates and their attendant costs to the Navy must be factored in.

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 DEMONSTRATION PROGRAM -- RECOMMENDED DEMONSTRATION PROJECTS -- Cont.
 

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Any effort in this program would probably include changes in the "top ten" elements damaged which account for 78% of all vandalism costs Navy-wide. These are:

- . Doors and Door Frames
- . Ceilings
- . Window Screens
- . Door Hardware
- . Vending Machines
- . Walls
- . Sofas and Chairs
- . Lights
- . Washing Machines and Dryers
- . Lockers

Another "top ten", more specifically linked to the vandalism scenarios developed in this project would be efforts in the following types of incidents:

- . Doors in Sleeping Rooms
- . Space Enclosures in Hallways
- . Service Equipment in Vending
- . Head Fixtures
- . Furnishings in Sleeping Rooms
- . Windows in Sleeping Rooms
- . Furnishings in Lounges



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DEMONSTRATION PROGRAM -- RECOMMENDED DEMONSTRATION PROJECTS -- Cont.

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- . Windows in Other Spaces
- . Fixed Attachments and Electrical in Other Spaces
- . Service Equipment in Other Spaces

The selection from these lists, of high priority targets is a function of the specific base chosen and its array of problems.

The overall tasks in this Demonstration Project would follow the model diagram presented previously.

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DEMONSTRATION PROGRAM -- RECOMMENDED DEMONSTRATION PROJECTS -- Cont.

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2. INCREASED HABITABILITY: *Testing the Effects of a Quality Environment Maintained at a Quality Level*

Approximately 7 to 10 high vandalism bases should be selected for this project, some with fairly extensive Discrepancies Lists. A full review of facilities for each selected base should be the basis for identification of elements which must be repaired. Costs and budgets for these repairs must be made. An intensive period of repair, followed by a Planned Maintenance System should be used to bring the base up to current habitability standards and maintained at that level. No specific actions would be taken to combat vandalism other than high levels of maintenance and ASAP repair. This should include use of Design Guidelines for site amenities to increase exterior habitability as well as interior habitability. Any other programs which increase habitability (permitting personalization in sleeping rooms, decoration of lounges) should be encouraged.

The overall tasks in this Demonstration Project would follow the model diagram presented previously.

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 DEMONSTRATION PROGRAM -- RECOMMENDED DEMONSTRATION PROJECTS -- Cont.
 

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 3. BETTER MANAGEMENT: *Testing the Effects of Non-Physical Changes Specifically Designed to Combat Vandalism*

Approximately 7 to 10 bases should be selected for this project, some with serious problems with management of BEQs and/or capacity to pay for repairs. A thorough review should be made of the bases' policy and procedures in the following four areas, for which Administrative Guidelines have been developed:

- a. Problems with Repairs and Paying for Repairs.
- b. Problems with BEQ Management
- c. Problems with Security and Patrols
- d. Problems with Communications and Orientations

After review, an appropriate set of Administrative Guidelines should be selected for implementation for each base. Most of these do not require any mandate beyond that of the base C.O.. Some however, such as "Paying for Repairs", imply a change in Naval policy, at least for the Demonstration Program. The project staff believes it would be very useful to test, in a time-limited and scope-limited manner, some possible changes in policy dealing with budgeting, host and tenant command fiscal and other relationships, and relationships between bases and Public Works.

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DEMONSTRATION PROGRAM -- RECOMMENDED DEMONSTRATION PROJECTS -- Cont.

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The overall tasks in this Demonstration Project would follow the model diagram presented previously.

4. ANTI-VANDALISM RENOVATION and INCREASED HABITABILITY and BETTER MANAGEMENT: Testing the Effects of All Three Changes Taken Simultaneously

This project utilizes the previous three strategies simultaneously and is to be seen as a maximum effort to combat vandalism and to increase habitability through better maintenance and administration of BEQs.

Approximately 4 to 7 bases with highest rates of vandalism should be selected for this project.

The materials discussed in the previous 3 demonstration project strategies all apply here.

The overall tasks in this Demonstration Project would follow the model diagram presented previously.

DEMONSTRATION PROGRAM -- RECOMMENDED EVALUATION METHODOLOGYINTRODUCTION

The purpose of the evaluation component of the proposed demonstration project is to determine the extent to which the recommended BEQ design and management changes reduce the cost of vandalism in Naval BEQs.

These recommendations begin with the assumption that for any BEQ design or management change instituted by the Navy, a subsequent decrease in vandalism will occur. For example, if walls are built as recommended, fewer (or less costly) incidents of wall damage should occur, if this assumption is correct. An evaluation attempts to confirm the accuracy of these assumptions or hypotheses.

Evaluation methodologies, on the other hand, begin with the assumption that each change does not provide the intended effect. It then becomes the responsibility of the evaluation design to show that the intended effect (i.e., fewer or less costly vandalism incidents) was achieved as a result of the treatment, (i.e., anti-vandalism renovation or better management.

In summary, the purpose of the evaluation program is to provide clear evidence of the utility of each of the recommended Demonstration Projects by the use of legitimate evaluation methodologies.

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RECOMMENDED EVALUATION METHODOLOGY -- Cont.

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Two fundamental concerns in designing any evaluation program are first, to identify those factors which might jeopardize the validity of the evaluation effort; and second, to minimize their effects. These factors fall into two categories: those which might affect the internal validity of the evaluation program, and those which might affect the external validity.\*

INTERNAL VALIDITY

When considering a program's internal validity, one asks whether the evaluation design chosen can show unequivocally that the introduced treatment (e.g., lockers with....stronger locker hasps) makes a difference or produces an intended effect (e.g., fewer or less costly incidents of damage to lockers). If the decrease in locker incidents can be attributed to any other factors, for example, substantially increased room inspections, then the evaluation program is not internally valid.

EXTERNAL VALIDITY

External validity addresses the issue of generalizability. When considering a program's external validity, one asks whether an effect in one context (e.g., decreased vandalism due to institution of a BEQ Advisory Council at NAS at X), will occur in

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\* For a more detailed explanation of these issues, see Campbell, D.T. and Stanley, J.C., Experimental and Quasi-Experimental Designs for Research, 1963.

RECOMMENDED EVALUATION METHODOLOGY -- Cont.

response to the same treatment in another context (e.g., institution of a BEQ Advisory Council at NAS at Y).

The question of external validity, it should be noted, is never completely answerable. Nonetheless, the selection of a design strong in both types of validity is obviously the ideal.

Our consideration of the possible threats to the internal and external validity of an evaluation undertaken at Naval bases has resulted in two products:

1. The selection of a Time-Series design for the evaluation methodology.
2. The development of a set of Guidelines for the detailed design of the evaluation. These guidelines address test site selection, measurement, data gathering and institution of test designs and programs.

In the following discussion, the time-series design is discussed first, followed by the list of guidelines. Then the rationale for both of these is presented in a series of charts. In these charts, the potential "threats" to validity are presented and the specific guidelines for decreasing each threat are listed. Examples of how the validity of the evaluation might be jeopardized, in the context of the specific demonstration projects which might be undertaken by the Navy, are also given.

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RECOMMENDED EVALUATION METHODOLOGY -- Cont.

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TIME-SERIES DESIGN

To minimize the "threats" to validity, the suggested evaluation methodology is a "time-series" design.

In order to carry out a time-series evaluation at a Naval base one would:

1. Institute routine measurement of vandalism, (for example, record the number of incidents and their cost) at the base.
2. Install an anti-vandalism design.
3. Continue measurement of vandalism.

The time-series\* can be diagrammed as:

$$\frac{0_1, 0_2, 0_3, 0_4 \quad X \quad 0_5, 0_6, 0_7, 0_8}{\text{TIME} \rightarrow}$$

where  $0_i$  is a measure of vandalism and X is the instituted change.

Then, the "before" and "after" series of measurements are compared.

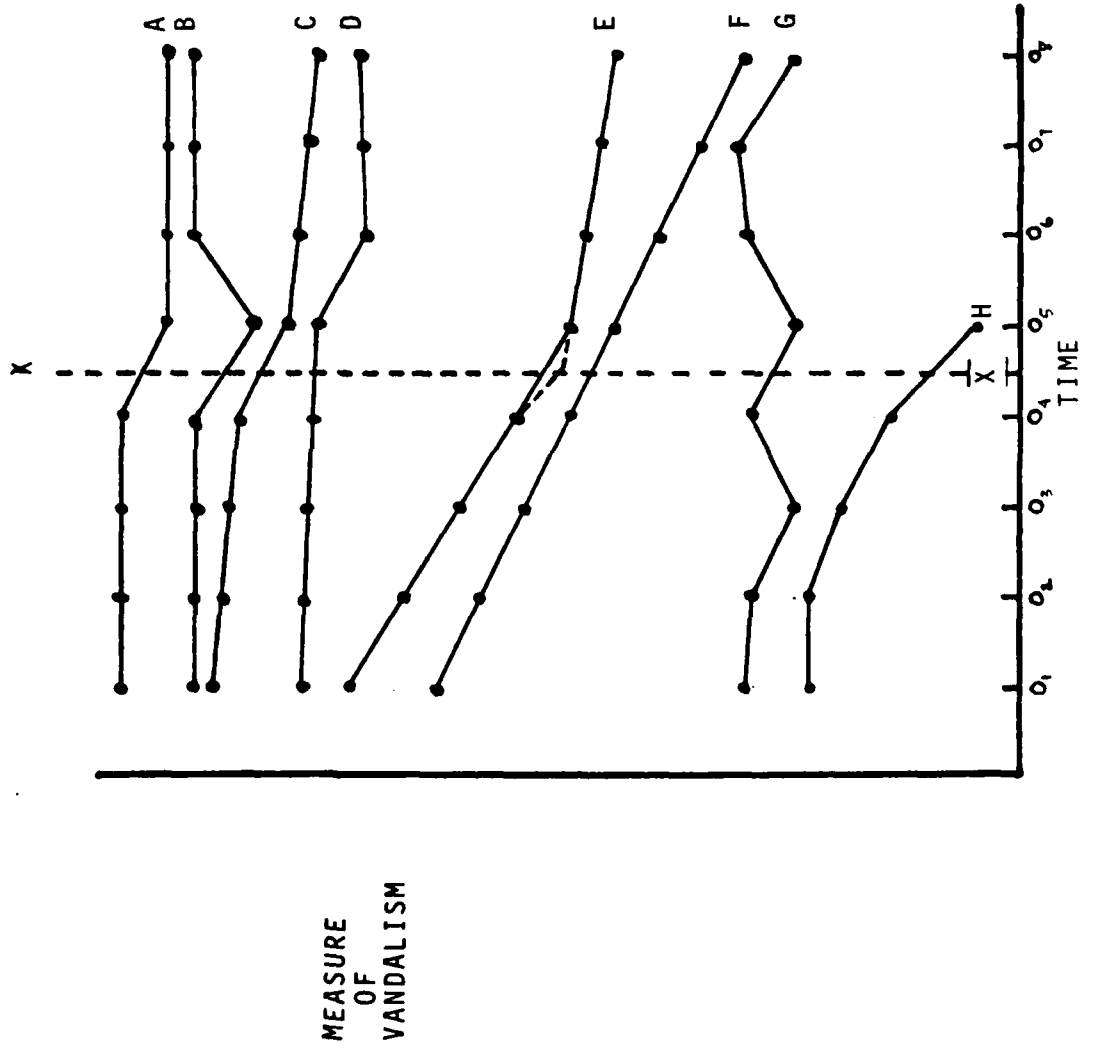
\*This design insures protection against all the "threats" to internal validity except for History. (See page 61.) In order to protect against "History" the evaluation team will need to monitor specific events which may interact with the treatment or its subsequent effects at the evaluation sites.



RECOMMENDED EVALUATION METHODOLOGY -- Cont.

ANALYSIS AND INTERPRETATION OF RESULTS

The figure below indicates some possible outcome patterns for a time-series which may occur after a design change has been introduced as indicated by the vertical line X.



(Diagram adapted from Campbell, D.T. and Stanley, J.C., *Experimental and Quasi-Experimental Designs for Research* 1963, p. 38.)

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RECOMMENDED EVALUATION METHODOLOGY -- Cont.

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From this figure, it can be inferred that X has had some effect on the measured observations on lines A and B and possibly C, D and E, but that lines F, G and H were not affected by the treatment, X.

Analysis of the "before" and "after" measurements may involve:

1. Statistical Tests
2. "Eye-Ball" analysis of the discontinuity of the measurement series
3. Cost analysis
4. Subjective perceptions of BEQ management
5. Attitudinal BEQ Resident data

The next three pages are a summation of the following section and can be used as an introduction to that section.

## SUMMARY OF GENERAL GUIDELINES FOR EVALUATION PROGRAM DESIGN

### ISSUES

#### SITE SELECTION

#### GUIDELINES

- ° Choose a site where no known major changes in base or BEQ operations will take place during the evaluation. Problem bases would include:
  - a. Bases undergoing major renovations.
  - b. Bases instituting new BEQ management policies.
  - c. Bases with unusual turnover in their BEQ Staff.
  - d. Bases with large and unusual fluctuations in the number of berthed sailors.
  - e. Bases with large and unusual turnover of berthed sailors.
- ° Choose a site where seasonal/climatic changes are minimal.
- ° Choose a site where BEQ buildings are relatively new or all of approximately the same age and design.

NOTE: We are not saying that there should be no changes on the bases at which the designs/programs are tested. Obviously, the only useful designs or programs are those which are proven effective under normal base/BEQ circumstances, such as routine changes in personnel, etc..

SUMMARY OF GENERAL GUIDELINES FOR EVALUATION PROGRAM DESIGN -- Cont.

ISSUES

SITE SELECTION (Cont.)

GUIDELINES

However, those bases which plan major and, essentially, one-time changes during the evaluation period, and whose planned changes have the potential for invalidating\* the effort, should be eliminated from consideration as test sites.

MEASUREMENT

- Measurement instruments should include measurements related to the specific design/program change as well as overall measures of change in the rate of vandalism.

- Measures should be non-reactive in nature.

- Data required should not change.

DATA GATHERING

- Record-keeping should be instituted at test and non-test sites.

- Recording required measurements should become a routine activity for the recorders.

\*Threats to the validity of an evaluation program are discussed in the following section.

SUMMARY OF GENERAL GUIDELINES FOR EVALUATION PROGRAM DESIGN -- Cont.

ISSUES

GUIDELINES

DATA GATHERING (Cont.)

- Recorders should be unaware of the evaluation-related purpose of their record keeping.
- Record-keeping personnel should not change.
- Instructions for record-keeping should not change.
- Record-keeping personnel should be trained for the task.

INSTITUTION OF TEST DESIGNS/PROGRAMS

- Not all changes should be instituted at the same sites.
- Compatible sets\* of changes should be instituted at each site.
- BEQ residents and staff should be unaware of the purpose of the designs/programs.
- Designs/programs should be instituted in a way which minimally disrupts the habitability of BEQs.

\* Examples of compatible sets of changes were given on pp. 46-51.

### THREATS TO INTERNAL VALIDITY

THREAT: *HISTORY, the specific events occurring, in addition to the treatment, between periods of data collection.*

### DISCUSSION

#### GUIDELINES

#### PROBLEM:

If this event(s) is related to the treatment, it may impact upon the intended effect in unknown ways. Thus, changes or differences in the intended effect cannot be directly related to the treatment.

Seasonal or climate changes may also be confused with the treatment.

#### EXAMPLE #1:

A policy of requiring security deposits from BEQ residents is instituted. At the same time, the occupancy of the BEQ changes, from a group of residents with one set of training and skills to a second group with entirely different backgrounds.

During the subsequent data collection period, it is found that the vandalism decreases. The decrease might be attributed to the new security deposit policy but in fact be due to the change in the type of resident. It

Choose a site where no known major changes in base or BEQ operations will take place during the evaluation. Problem bases would include: bases undergoing major renovations; bases with new BEQ management policies or large changes in personnel (BEQ staff or large changes in the number of berthed sailors).

Choose a site where seasonal/climatic changes are minimal.

THREATS TO INTERNAL VALIDITY

THREAT: *HISTORY, the specific events occurring, in addition to the treatment, between periods of data collection. (Cont.)*

DISCUSSION

should be noted that we were unable to collect any data which would allow us to determine the relationship, if any, between characteristics of BEQ residents and incidence of vandalism. Therefore, in any evaluation program, the composition of the BEQ population must remain relatively stable.

EXAMPLE #2:

A policy of increased quality and speed of BEQ maintenance is instituted. At the same time, winter begins. During the summer, BEQ residents spend most of their off-duty hours in recreational activities outside the BEQ. However, the harshness of the winter at this particular base, and the inaccessibility of winter sports, such as skiing, snowmobiling, etc., require the residents to spend most of their off-duty time inside the BEQ.

See previous page.

GUIDELINES

During the subsequent data collection period, vandalism is found to increase. It would be a mistake to conclude that the new maintenance policy caused vandalism to in-

THREATS TO INTERNAL VALIDITY

THREAT: *HISTORY*, the specific events occurring, in: addition to the treatment, between periods of data collection. (Cont.)

DISCUSSIONGUIDELINES

crease, when in fact, the increased activity inside the BEQ and the accompanying boredom and frustration are probably at fault.



### THREATS TO INTERNAL VALIDITY

THREAT: MATURATION, processes which occur as a function of the passage of time.

### DISCUSSION

#### GUIDELINES

#### PROBLEM:

If changes occur at the place of observation due to the aging process, these changes may mistakenly be recorded as effects directly due to the treatment.

#### EXAMPLE:

Stronger doors are installed in a BEQ to reduce door damage. However, at the time the doors are installed, the furniture in the BEQ is close to the age at which it is unable to withstand normal wear and tear. During the subsequent data collection period, it is found that door damage has decreased but that furniture damage is increasing. The mistaken conclusion might be that the vandalism is being "transferred" from doors to furniture and that it is not worth installing the stronger doors because the reduction in vandalism cost they produce is offset by the increase in furniture damage.

To minimize the effects of maturation, choose a site where BEQ buildings are relatively new and all of approximately the same age and design.

### THREATS TO INTERNAL VALIDITY

THREAT: TESTING, the effects of taking a "test", or using a measurement, upon the scores of a second measurement.

### DISCUSSION

#### PROBLEM:

If recording an event spurs additional change, other than expected, it may be confused with the effects of the instituted treatment.

#### EXAMPLE #1:

A BEQ Manager is asked to be especially careful about documenting incidents of wall damage, because installing stronger walls is being considered. He starts to inspect walls more frequently than before and also pushes through repairs faster. Then the stronger walls are installed. During the subsequent data collection period, wall damage decreases. However, prior to the installation of the stronger walls, BEQ residents have noticed the special attention and efforts of the Manager and have become considerably more careful around walls. It might be concluded that stronger walls decrease wall damage when, in fact, the decrease should be attributed to the special efforts of the BEQ Manager, the increased quality of maintenance and the increased concern of residents.

### GUIDELINES

1. To avoid testing effects, the measurement instruments should become routine activities for the recorders of the intended effects. This solution also prescribes that recorders be unaware of the purposes of their activity in relationship to the evaluation program.
2. Measures should be non-reactive in nature. A reactive effect can be expected whenever the recording process is in itself a stimulus to change rather than a passive record of observation. Recording incidents of vandalism, will of course, produce repair and restitution. In most cases, however, the

THREATS TO INTERNAL VALIDITY

THREAT: *TESTING, the effects of taking a "test", or using a measurement, upon the scores of a second measurement. (Cont.)*

DISCUSSION

GUIDELINES

measuring instrument should not produce more or less repair than would ordinarily occur. A routinized recording instrument should be in place on the chosen site before the treatment is instituted and should create less reactivity.

EXAMPLE #2:

Stronger doors are installed in a BEQ. However, the BEQ Manager starts to inspect doors more frequently than he did during the prior data-gathering period. In response to the Manager's actions and rumors that "vandal-proof" doors are being tested, a small group of sailors decides to do their best to prove that the new doors are, in fact, not "vandal-proof". In the subsequent data-gathering period, door damage increases. It would be a mistake to conclude that the new doors do not work, when the evaluation program's management is at fault.

See previous page.

### THREATS TO INTERNAL VALIDITY

THREAT: *INSTRUMENTATION, in which changes in the calibration of a measuring instrument or changes in the scores used may produce changes in the obtained measurements.*

### DISCUSSION

### GUIDELINES

#### PROBLEM:

If instrument of measurement changes, the differences recorded may be confused with the treatment.

Use a routine recording instrument where instructions/data required or personnel responsible for completion do not change.

#### EXAMPLE:

A BEQ Manager is asked to collect baseline data at the onset of the evaluation program. His task is to record all incidents of property damage occurring in the BEQ and to give his opinion regarding the cause of damage, e.g., accidental, malicious, design deficient. The Manager is the type of person who, when in doubt about the cause of damages, tends to call it malicious. The recommended changes are then made in the BEQ. At the same time, the Manager leaves and is replaced. The new Manager takes on the responsibility of keeping property damage records, but is the kind of person who, when in doubt about the case of the damage, tends to call it accidental. The results of this kind of measurement could be very misleading. For example, if the change in the BEQ is a management change (such as

### THREATS TO INTERNAL VALIDITY

THREAT: INSTRUMENTATION, in which changes in the calibration of a measuring instrument or changes in the scores used may produce changes in the obtained measurements. (Cont

### DISCUSSION

#### GUIDELINES

instituting a Tenant Advisory Council) intended to increase the concern of BEQ residents and decrease the number of attempts to damage, two specific problems arise in interpreting the data:

1. The baseline data collected by the first BEQ manager is skewed towards malicious vandalism. In fact, there may not have been sufficient malicious vandalism to justify the program. Recording the vandalism as accidental property damage may have pointed to design deficiencies in BEQ elements and a program addressing these deficiencies, rather than malicious vandalism, would have been instituted.
2. The test data is skewed towards accidental property damage, and might actually indicate that malicious property damage has decreased and that accidental property damage has increased. At this point, a second test program addressing the latter might be considered. While the second program probably will address the real problem, time and money have been spent unnecessarily on the first.

### THREATS TO INTERNAL VALIDITY

THREAT: *STATISTICAL REGRESSION, operating where area of interest has been selected on the basis of extreme criteria.*

### DISCUSSION

### GUIDELINES

#### PROBLEM:

If an extreme criterion is used in selection of the target, usually some change occurs which reduces the "extremeness". This natural change may become confounded with the intended treatment effects.

#### EXAMPLE:

In order to select bases at which improved building elements addressing vandalism can be tested, twenty bases are asked to report the incidence and cost of vandalism, by BEQ type, over a three-month period. On the basis of this data, the ten BEQs with the highest vandalism costs are chosen and the improved building elements are installed. During the subsequent data collection period, seven BEQs report decreases in vandalism costs of approximately 40% and the remaining three report decreases of approximately 10%. It is concluded that the improved building elements are effective in all ten BEQs. However,

While it is necessary to choose a site where vandalism is a large enough problem for eventual changes due to remedial programs to be seen, a site chosen in this manner should have a persistent vandalism problem, not one which has recently occurred, or which occurs only periodically.

THREATS TO INTERNAL VALIDITY

THREAT: STATISTICAL REGRESSION, operating where area of interest has been selected on the basis of extreme criteria -- Cont.

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DISCUSSIONGUIDELINES

over any six-month period there is a natural fluctuation in vandalism costs.

Therefore, although the improved building elements are effective in the seven BEQs which showed 40% cost decreases, they are not necessarily effective in the three BEQs with the less substantial cost decreases. The natural fluctuation in vandalism costs has been confused with the effectiveness of the improved building elements.

## THREATS TO INTERNAL VALIDITY

THREAT: BIAS, resulting in differential selection for comparison.

## DISCUSSION

### GUIDELINES

#### PROBLEM:

If an evaluation design requires that a comparison be made between two groups or bases and there are differences between these groups, then these differences may produce unintended effects which may confound treatment effects.

#### EXAMPLE

In order to assess the effectiveness of a high quality BEQ maintenance program, two bases of approximately the same size, BEQ types, mission and BEQ management practices are selected. The improved maintenance program is instituted at one base but not at the other. During the subsequent data collection period, vandalism is found to decrease somewhat on the test base, but not at the other. However, the test base is located close to recreation areas, whereas the comparison base is not. Therefore, these improved effects cannot legitimately be claimed to be a direct function of improved maintenance, since the effects of the location of recreational facilities being close to the base has not been included.

The solution to selection is to match bases on all characteristics which are important in predicting rates of vandalism so that differences are minimized. However, the initial data gathering has not resulted in any reliable characteristics on which bases could be matched. Therefore, a second solution would be to use an evaluation design which would not use comparison groups.

Also, bases vary on too many potentially important criteria to allow good matching to be completed (i.e., mission, staff).



THREATS TO INTERNAL VALIDITY

THREAT: MORTALITY, differential loss or gain of people from comparison groups.

DISCUSSION

GUIDELINES

PROBLEM:

If an evaluation design requires that a comparison be made between two groups or bases and large fluctuations in the number of men berthed occur over the period of testing, these fluctuations may produce unintended effects which may confound treatment effects.

Do not use an evaluation design with comparison groups.

EXAMPLE

In order to assess the effects of anti-vandalism renovation, two bases having equivalent BEQ types, similar base missions and equivalent numbers of berthed personnel are chosen. The design changes are made at one base, and not at the other. The analysis of the data shows a decrease in vandalism at the test site. However, during the data collection phase, all BEQs at the comparison base were forced to go on emergency overload procedure and an older, usually not used BEQ was required to open to house sailors who had come to the base for a summer training program. The relative number of sailors berthed at the test base remained constant. The differences in vandalism found in the comparison between these two bases

THREATS TO INTERNAL VALIDITY

THREAT: MORTALITY, differential loss or gain of people from comparison groups. -- Cont.

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DISCUSSION

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GUIDELINES

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could be attributed to the differences in the number of berthed personnel rather than the design changes. Therefore, the design changes have not been adequately evaluated.

## INTERNAL VALIDITY

*... SENSITIZES RECORDERS TO THE PHENOMENON UNDER STUDY AND THUS MAKES THE RESULTS OBTAINED FOR THE OBSERVED POPULATION UNREPRESENTATIVE OF THE INTENDED EFFECTS FOR THE UNOBSERVED POPULATION WHO MAY BE SIMILAR TO THE POPULATION OBSERVED.*

## DISCUSSION

### GUIDELINES

#### PROBLEM:

If the act of measurement or observation acts to "legitimize" a phenomenon under study, generalization of the treatment and its effects may be limited unless the phenomenon of study has been equally legitimized to the intended place of generalization.

#### EXAMPLE:

A base has been selected to test anti-vandalism renovation. During the initial data gathering period, before the changes are instituted, the BEQ manager becomes aware of the magnitude of the vandalism on his base while he is collecting the data, and decides to make changes in BEQ management policy and maintenance. The final tests of the design changes show them to be effective in reducing vandalism. The Navy decides to introduce these design changes at other bases who have not gone through an initial data ga-

If the evaluation project shows utility of the selected recommendations, this tested usefulness has occurred under continued observation of vandalism, which has not occurred at other bases where the same instituted treatment may be installed. Thus, the phenomenon "legitimacy" achieved under the tested conditions may be absent which may affect the intended results.

One solution to this problem of representativeness of findings is to institute the measurement instrument to bases Navy-wide, although the demonstration will be only on a few bases. (Most

### THREATS TO EXTERNAL VALIDITY

THREAT: INTERACTION OF TESTING AND TREATMENT, occurs when the measurement instrument sensitizes recorders to the phenomenon under study and thus makes the results obtained for the observed population unrepresentative of the intended effects for the unobserved population who may be similar to the population observed. (Cont.)

### DISCUSSION

thering procedure and upon later evaluation do not find as positive results as at the test base. The absence of the increased "sensitivity" of the BEQ managers to the magnitude of the vandalism problem gained by accurate record-keeping at the test site, could be responsible for the smaller changes in vandalism.

### GUIDELINES

bases have already been "sensitized" to the problem of vandalism by the study on which this report is based, therefore the request to continue keeping records should not be seen as unusual.)

This solution has the added utility of starting a record-keeping procedure which has previously been ignored but needed. Also, this type of record-keeping will allow for continued evaluation efforts after the demonstration project.

THREATS TO EXTERNAL VALIDITY

THREAT: *REACTIVE EFFECTS OF EVALUATION ARRANGEMENTS, which would preclude generalization about the effect of the treatment upon other people or sites being exposed to it under non-evaluation settings.*

DISCUSSION

GUIDELINES

PROBLEM:

If evaluation conditions are artificial, for example, disruptive of everyday routine, then the situations at the test sites are not comparable to those at other bases.

EXAMPLE:

A base is selected for testing anti-vandalism design changes. From this, the base staff has mistakenly gained the impression that the performance of the base as a whole is under evaluation. (Actually, the specific design changes are being tested and the base is simply one of many who have a property damage problem occurring for reasons other than management policy.) Gross changes in management procedures base-wide are instituted during the testing phase to be sure the base is in "tip-top" shape.

Meanwhile, sailors become aware of the increased concern of base staff, and minimize their attempts to vandalize

The evaluation design should include measurement procedures which are routine. Introduction of the proposed changes should be completed in a way which minimizes the evaluation component and minimally disrupt the habitability of the BEQs.

THREATS TO EXTERNAL VALIDITY

THREAT: REACTIVE EFFECTS OF EVALUATION ARRANGEMENTS, which would preclude generalization about the effect of the treatment upon other people or sites being exposed to it under non-evaluation settings -- Cont.

DISCUSSION

GUIDELINES

for fear of reprisal. Evaluation shows enormous decreases in the amount of vandalism. The Navy then decides to introduce the tested design changes Navy-wide. They are found to be less effective at these bases. This occurs because the "artificiality" of conditions created at the test base precludes it from being similar to naval bases operating under normal conditions.

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## DESIGN GUIDELINES

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### BACKGROUND

In order to develop physical design guidelines for new construction and renovation of BEQ quarters, those building elements having the highest vandalism costs were selected. The number of incidents by space, their estimated costs by space, the percentage of incidents by space, the percentage of element cost by space, as well as totals across spaces, were analyzed and those spaces or elements selected which showed significant damage to which design responses could be developed. These are presented in the next section before the Design Guidelines themselves.

In the Design Guidelines, one or more design considerations were written which summarized the vandalism problem for that element or combination of elements. For each design consideration, a possible design response was developed which prescribes physical actions to be taken whose result is the reduction of vandalism to that element.

VANDALISM BY BEQ SPACE

In this section, the estimated annual frequency and cost of vandalism is presented by the BEQ space in which the damage occurred. We have presented our findings in this way for two reasons:

1. To provide a basis for selecting particular spaces to address with remedial programs or designs.
2. To allow the development of space-specific sets of strategies addressing, when appropriate, BEQ design, construction, materials selection and management.

The following discussion consists first of a ranking of the BEQ spaces, from highest to lowest, by the percent of total vandalism cost each represents. Then those elements which constitute between eighty and ninety percent of the total damage cost in each space are listed.

| BEQ SPACE         | ESTIMATED COST<br>(1976) | % OF COST | ESTIMATED ANNUAL NO. OF INCIDENTS | % OF TOTAL |
|-------------------|--------------------------|-----------|-----------------------------------|------------|
| 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%         |
|                   | \$ 7,303,000             | 100%      | 178,000                           | 100%       |

ESTIMATED ANNUAL FREQUENCY AND COST OF VANDALISM BY BEQ SPACE



VANDALISM BY BEQ SPACE -- CONT.

Sleeping Rooms

As is shown on the table on the previous page, vandalism in BEQ sleeping rooms accounted for almost 40% of the total cost of vandalism in BEQs in 1976.

Damage of twenty different sleeping room elements was reported. However, damage to only five of these twenty constituted almost 90% of the cost of all vandalism in sleeping rooms. In the table below, these five elements are listed and the estimated frequency and cost of damage to each is shown.

ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE IN SLEEPING ROOMS BY ELEMENT DAMAGED

| <u>ELEMENT DAMAGED</u> | <u>ESTIMATED COST</u> | <u>% COST</u> | <u>NO. OF INCIDENTS</u> | <u>% OF INC.</u> |
|------------------------|-----------------------|---------------|-------------------------|------------------|
| Door and Door Frame    | \$ 818,000            | 30%           | 8,900                   | 16%              |
| Door Hardware          | 654,000               | 24%           | 6,000                   | 10%              |
| Window Screen          | 430,000               | 16%           | 12,600                  | 22%              |
| Lockers                | 216,000               | 8%            | 9,800                   | 17%              |
| Curtains and Blinds    | 145,000               | 5%            | 2,900                   | 5%               |
| Thermostats            | 135,000               | 5%            | 1,700                   | 3%               |
| <b>SUBTOTAL</b>        | <b>\$ 2,398,000</b>   | <b>88%</b>    | <b>41,900</b>           | <b>73%</b>       |
| All Other Elements     | 371,000               | 12%           | 15,100                  | 27%              |
| <b>TOTAL</b>           | <b>\$ 2,769,000</b>   | <b>100%</b>   | <b>57,000</b>           | <b>100%</b>      |

VANDALISM BY BEQ SPACE -- CONT.

Hallways

Vandalism in BEQ hallways accounted for almost one-fourth of the total cost of vandalism in BEQs in 1976.

As with sleeping rooms, a large number (21) of different elements were reported damaged, but that sustained by only five of these constitutes almost 90% of the total cost of vandalism in hallways. In the table below, these five elements are listed, and the estimated frequency and cost of damage to each is shown.

ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE IN HALLWAYS

BY ELEMENT DAMAGED

| <u>ELEMENT DAMAGED</u>    | <u>ESTIMATED COST</u> | <u>% COST</u> | <u>NO. OF INCIDENTS</u> | <u>% OF INC.</u> |
|---------------------------|-----------------------|---------------|-------------------------|------------------|
| Ceiling                   | \$ 801,000            | 56%           | 2,500                   | 10%              |
| Walls                     | 239,000               | 17%           | 5,400                   | 21%              |
| Lights                    | 105,000               | 7%            | 6,100                   | 24%              |
| Window Glass              | 72,000                | 5%            | 1,000                   | 4%               |
| Fire Extinguishers        | 60,000                | 4%            | 3,300                   | 13%              |
| <b>SUBTOTAL</b>           | <b>1,277,000</b>      | <b>89%</b>    | <b>18,300</b>           | <b>72%</b>       |
| <b>All Other Elements</b> | <b>166,000</b>        | <b>11%</b>    | <b>6,700</b>            | <b>28%</b>       |
| <b>TOTAL</b>              | <b>\$1,443,000</b>    | <b>100%</b>   | <b>25,000</b>           | <b>100%</b>      |

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VANDALISM BY BEQ SPACE -- CONT.


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Other

BEQ spaces included in this category are: T.V. and recreation rooms, lobbies, laundries, offices and grounds. Vandalism in these spaces, as a group, accounted for almost 15% of the total cost of vandalism in BEQs in 1976.

Once again, damage to many different elements (22) was reported, but that sustained by only a few (4) constituted almost 90% of the cost of all vandalism in these spaces. These four elements are listed in the table below, and the estimated frequency and cost of damage to each is shown.

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ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE IN "OTHER"


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BEQ SPACES BY ELEMENT DAMAGED

| <u>ELEMENT DAMAGED</u>    | <u>ESTIMATED COST</u> | <u>% COST</u> | <u>NO. OF INCIDENTS</u> | <u>% OF INC.</u> |
|---------------------------|-----------------------|---------------|-------------------------|------------------|
| Window Screen             | \$ 340,000            | 35%           | 8,100                   | 29%              |
| Washing Machines & Dryers | 218,000               | 22%           | 3,200                   | 12%              |
| Lights                    | 185,000               | 19%           | 9,100                   | 33%              |
| Sprinkler Head            | 101,000               | 10%           | 4,000                   | 15%              |
| SUBTOTAL                  | \$ 844,000            | 86%           | 24,400                  | 89%              |
| All Other Elements        | 134,000               | 14%           | 2,600                   | 11%              |
| TOTAL                     | \$ 978,000            | 100%          | 27,000                  | 100%             |

VANDALISM BY BEQ SPACE -- CONT.

Lounges

Vandalism in lounges accounted for approximately 11% of the total cost of vandalism in BEQs in 1976.

Similar to all the other spaces, damage to many different elements (19) was reported, but that sustained by comparatively few (6) constituted almost 80% of the total cost of vandalism in lounges. These six elements are listed in the table below, and the estimated frequency and cost of damage to each is shown.

ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE IN LOUNGES  
BY ELEMENT DAMAGED

| ELEMENT DAMAGED      | ESTIMATED COST | % COST | NO. OF INCIDENTS | % OF INC. |
|----------------------|----------------|--------|------------------|-----------|
| Sofas and Chairs     | \$ 314,000     | 40%    | 7,500            | 36%       |
| Walls                | 94,000         | 12%    | 3,500            | 17%       |
| Floors               | 69,000         | 9%     | 600              | 3%        |
| Door and Door Frames | 50,000         | 6%     | 800              | 4%        |
| Lamps                | 43,000         | 6%     | 700              | 3%        |
| Window Glass         | 30,000         | 4%     | 900              | 4%        |
| SUBTOTAL             | 600,000        | 77%    | 14,000           | 67%       |
| All Other Elements   | 175,000        | 23%    | 7,000            | 33%       |
| TOTAL                | \$ 775,000     | 100%   | 21,000           | 100%      |

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VANDALISM BY BEQ SPACE -- CONT.


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Heads

Damage in heads accounted for approximately 9% of the total cost of vandalism in BEQs in 1976.

Once again, damage to many different elements (18) was reported, but that sustained by comparatively few (7) constituted approximately 80% of the cost of all vandalism in heads. These seven elements are listed in the table below and the estimated frequency and cost of damage to each is shown.

ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE IN HEADS BY ELEMENT DAMAGED

| <u>ELEMENT DAMAGED</u> | <u>ESTIMATED COST</u> | <u>% COST</u> | <u>NO. OF INCIDENTS</u> | <u>% OF INC.</u> |
|------------------------|-----------------------|---------------|-------------------------|------------------|
| Urinals                | \$ 180,000            | 27%           | 10,100                  | 27%              |
| Paper holders          | 89,000                | 13%           | 5,100                   | 14%              |
| Shower Heads           | 71,000                | 10%           | 7,800                   | 21%              |
| Partitions             | 60,000                | 9%            | 1,000                   | 3%               |
| Sinks                  | 56,000                | 8%            | 2,100                   | 6%               |
| Mirrors                | 44,000                | 7%            | 2,500                   | 7%               |
| Toilets                | 40,000                | 6%            | 1,800                   | 5%               |
| SUBTOTAL               | 540,000               | 80%           | 30,400                  | 83%              |
| All Other Elements     | 138,000               | 20%           | 6,600                   | 17%              |
| TOTAL                  | \$ 678,000            | 100%          | 37,000                  | 100%             |

VANDALISM BY BEQ SPACE -- CONT.Vending Areas

As with heads, damage in vending areas accounted for approximately 9% of total cost of vandalism in BEQs in 1976.

Although damage to 10 elements was reported, that sustained by vending machines alone represents almost 90% of the total cost of damage in vending areas.

ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE IN VENDING AREAS BY ELEMENT DAMAGED

| <u>ELEMENT DAMAGED</u> | <u>ESTIMATED COST</u> | <u>% COST</u> | <u>NO. OF INCIDENTS</u> | <u>% OF INC.</u> |
|------------------------|-----------------------|---------------|-------------------------|------------------|
| Vending Machines       | \$ 585,000            | 89%           | 7,400                   | 67%              |
| All Other Elements*    | 75,000                | 11%           | 3,600                   | 33%              |
| TOTAL                  | \$ 660,000            | 100%          | 11,000                  | 100%             |

\* Includes damage to: walls, floors, ceilings, ceilings, window glass, switches and outlets, phones and booths, washing machines and dryers, coin changers, sofas and chairs.

# SITE PLANNING

## DESIGN CONSIDERATIONS

1. Standard building designs can be used in many site configurations. Site visits showed that identical building blocks sited differently had a profound effect on the overall habitability of the complex.

2. Much current site planning would appear to have as its goal the esthetics of well-maintained broad lawns and planting of trees as esthetic objects rather than fuller consideration for the amenities from exterior site utilization. Outdoor space is minimally used.

## POSSIBLE DESIGN RESPONSES

1. Site planning using definitive designs should make every attempt to increase feelings of community, to increase natural (or peer) surveillance and management surveillance. Careful placement of laundry buildings, lounges and other communal facilities can do much to increase easy interaction. Even where the function (like a laundry) is seen as unesthetic, its social value should elevate it to an important element in site planning. Serious consideration should be given to using building blocks in quadrangles, much like older college buildings are planned. Smaller enclosed outdoor spaces should be sought rather than large expanses of green, and these spaces should be used and planned for use. Outdoor study while sunbathing, a 4 o'clock beer, and bull sessions under a tree are activities which rightly should take place in quads. Where Women's Quarters (EQQ's) have been placed as one unit in a quad, a high degree of cleanliness and manners has been observed in the whole quad.

2. Site planning should be activity based and use of paths, planting, windscreens, natural topography, and outdoor furniture should be planned to provide shade, windbreaks and natural gathering places at different levels of privacy and accessibility.

3. Orientation to the sun and prevailing winds should be a primary concern, not just for energy consumption considerations, but to increase thermal and air movement comfort and thereby, habitability.

# BUILDING DESIGN

## DESIGN CONSIDERATIONS

1. The current process and schedule of designing buildings tends to restrict any meaningful participation by base personnel, including those most senior.
2. Certain definitive designs do not work as intended. Notable is the Melton Beckett model, whose lounges are seldom used and never personalized by the inhabitants of the rooms. In many site visits, there was no evidence of use...no T.V. sets, no magazines, no posters, no dirty ashtrays. Security is the problem. While enlisted men are willing to share with their roommates, they are not willing to do so with 9 other men.

## POSSIBLE DESIGN RESPONSES

1. Mechanisms should be sought for a more participatory mode of design, including site planning. Where strong BEQ tenant councils exist, they would be good candidates for such participation in conjunction with senior officers.
2. The future use of Melton Beckett models should be carefully examined. The lounge concept works minimally or not at all and there is some lack of privacy for the rooms facing the walkway. The walkway, however, is useful both socially and as a surveillance aid. The project staff has unsuccessfully attempted to design a re-use for the lounges.
3. Design BEQ's with single entry points channeling all traffic past the duty desk. Necessary perimeter fire egress should be T.V. or alarm monitored.
4. Plan for more centralization and natural surveillance of vending areas and laundry areas.



DESIGN CONSIDERATIONSPOSSIBLE DESIGN RESPONSES

3. Many BEQ's are designed with too many entry/exit points for any central security point to work.

(See previous page.)

4. Heavily vandalized areas (like laundry, vending) are often tucked away denying any natural surveillance or control. Further, if the trip to the front desk is too long, the vending machine will be vandalized for the refund rather than going to the front desk.

# SPACE ENCLOSURES

## INTRODUCTION

Damage to space enclosures, (wall, floors and ceilings), accounted for an estimated 20% of the cost of property damage in BEQs in 1976.

It is estimated that slightly more than 23,000 incidents occurred at a cost of over \$1,400,000, or approximately \$62 per incident.

As shown in the table below:

1. Although damage to walls accounts for approximately 57% of all the vandalism incidents involving space enclosures, it represents only 34% of their cost.
2. Although damage to floors accounts for approximately 21% of the incidents, it represents only 7% of their cost.
3. Although damage to ceilings accounts for approximately 22% of the incidents, it represents almost 60% of their cost. The estimated average cost of repairing damage to ceilings is \$165 per vandalism incident: more than seven times the average cost of floor repair and almost five times the average cost of wall repair.

| Element Damaged | Est. No. of Incidents (1976) | % Incidents | Estimated Cost (1976) | % Cost | Average Cost per Incident |
|-----------------|------------------------------|-------------|-----------------------|--------|---------------------------|
| Walls           | 13,000                       | 57%         | \$ 492,000            | 34%    | \$ 37                     |
| Floors          | 5,000                        | 21%         | 104,000               | 7%     | 22                        |
| Ceiling         | 5,000                        | 22%         | 843,000               | 59%    | 165                       |
| TOTAL           | 23,000                       | 100%        | \$ 1,439,000          | 100%   | \$ 224                    |

# SPACE ENCLOSURES WALLS

## STATISTICS

It is estimated that approximately 13,000 incidents of wall damage occurred in 1976, costing approximately \$492,000.

Wall damage was reported in all BEQ spaces, as can be seen in the table below.

Damage to hallway walls accounted for almost 50% of the total cost of wall damage.

## ESTIMATED COST AND FREQUENCY OF WALL DAMAGE BY BEQ SPACE

| Location of Damage | Est. No. of Incidents (1976) | % Incidents | Estimated Cost (1976) | % Cost      |
|--------------------|------------------------------|-------------|-----------------------|-------------|
| Sleeping Rooms     | 1,300                        | 9%          | \$ 75,000             | 15%         |
| Lounges            | 3,500                        | 27%         | 94,000                | 19%         |
| Heads              | 2,200                        | 17%         | 29,000                | 6%          |
| Hallways           | 5,400                        | 41%         | 239,000               | 49%         |
| Vending            | 400                          | 3%          | 20,000                | 4%          |
| Other              | 400                          | 3%          | 35,000                | 7%          |
| <b>TOTAL</b>       | <b>13,200</b>                | <b>100%</b> | <b>\$ 492,000</b>     | <b>100%</b> |

## SPACE ENCLOSURES WALLS

### DESIGN CONSIDERATIONS

Holes are punched or kicked in walls; wallpaper is ripped off walls; walls are written on or painted; walls are burned with cigarette butts and scratched with sharp instruments.

### POSSIBLE DESIGN RESPONSES

1. Construct walls of materials which will not break when punched or kicked. (*Material Selection*)
  2. Specify modular, removable wall panels instead of large, homogenous wall areas: keep replacement panels in stock and replace damaged panels as soon as damage occurs. (*Material Selection; Maintenance*)
  3. Paint walls with colors similar to the substance of the wall material itself. Contrasting colors reveal scratches more easily; OR use wall materials with an integral color which does not require painting; OR use wall materials with a permanent, non-scratchable finish. (*Material Selection*)
  4. Do not use wallpaper or any other wall covering which can be ripped off walls. (*Material Selection*)
  5. Specify wall coverings from which scuff marks, crayon, pen, magic marker and pencil markings can easily be removed by ordinary cleaning methods. (*Material Selection*)
  6. If (5) above is not possible, specify wall coverings from which marks can be removed with special cleaning substances. Keep a supply of the cleaning substances in stock. (*Material Selection; Maintenance*)
- OR
7. Have maintenance staff keep quick-drying touch-up paint in stock and repair damage as soon as possible. (*Material Selection; Maintenance*)

# SPACE ENCLOSURES FLOORS

## STATISTICS

It is estimated that approximately 5,000 incidents of damage to floors occurred in 1976, costing approximately \$104,000.

Floor damage was reported in all BEQ spaces, except for heads as can be seen in the table below.

Damage to lounge floors accounted for 66% of the total cost of floor damage, although the frequency of floor damage incidents in vending areas (52%) was higher than in lounges (13%).

## ESTIMATED COST AND FREQUENCY OF FLOOR DAMAGE BY BEQ SPACE

| <u>LOCATION OF DAMAGE</u> | <u>ESTIMATED NO. OF INCIDENTS (1976)</u> | <u>% INCI-DENTS</u> | <u>ESTIMATED COST (1976)</u> | <u>% COST</u> |
|---------------------------|--|---------------------|------------------------------|---------------|
| Sleeping Rooms            | 200                                      | 4%                  | \$ 3,000                     | 3%            |
| Lounges                   | 600                                      | 13%                 | 69,000                       | 66%           |
| Heads                     | --                                       | --                  | --                           | --            |
| Hallways                  | 1,200                                    | 25%                 | 6,000                        | 6%            |
| Vending                   | 2,500                                    | 52%                 | 23,000                       | 22%           |
| Other                     | 300                                      | 6%                  | 3,000                        | 3%            |
| <b>TOTAL</b>              | <b>4,800</b>                             | <b>100%</b>         | <b>\$ 104,000</b>            | <b>100%</b>   |

# FLOORS

DESIGN CONSIDERATION

Carpets are burned with cigarette butts; frequently stained from spilled drinks.

POSSIBLE DESIGN RESPONSES

1. Use carpeting whose color/texture/pattern doesn't show dirt or scorch marks, e.g., "salt and pepper" rug. Specify high durability carpeting. (*Material Selection*)
2. Buy and stock extra carpet or "plugs" to quickly replace damaged carpeting. (*Maintenance*)
3. Minimize floor damage by appropriate use of floor surfaces based on room use (carpeting only in selected spaces). (*Material Selection*)
4. Use modular carpet tiles which can be easily replaced. (*Material Selection; Maintenance*)
5. If carpets are desired to reduce noise in work or recreation areas, utilize a high grade acoustic ceiling (NIC of over 18) in its place and remove carpet. (*Building Design; Material Selection*)

# SPACE ENCLOSURES FLOORS

## DESIGN CONSIDERATION

Floor tiles are often broken when heavy things are dropped on them or are damaged by chemicals from fire extinguisher "fights".

## POSSIBLE DESIGN RESPONSES

1. Use floor surface that will not be damaged or delaminate from frequently present chemicals or impact from heavy objects. (*Material Selection*)
2. In appropriate areas, use interlocking, rubber floor tiles that will not loosen if wet, or break if struck by heavy object. (*Material Selection*)
3. Minimize floor damage by selection of appropriate floor surfaces based on room use. (*Material Selection*)

# SPACE ENCLOSURES CEILINGS

## STATISTICS

It is estimated that approximately 5,000 incidents of damage to ceilings occurred in 1976, costing approximately \$843,000.

Ceiling damage was reported in all BEQ spaces, except for heads, as can be seen in the table below.

Damage to hallway ceilings accounted for 95% of the total cost of ceiling damage, and 49% of the total number of incidents.

## ESTIMATED COST AND FREQUENCY OF CEILING DAMAGE BY BEQ SPACE

| LOCATION OF DAMAGE | ESTIMATED NO. OF INCIDENTS (1976) | % INCI-DENTS | ESTIMATED COST (1976) | % COST |
|--------------------|-----------------------------------|--------------|-----------------------|--------|
| Sleeping Rooms     | 700                               | 13%          | \$ 7,000              | < 1%   |
| Lounges            | 1,800                             | 35%          | 30,000                | 4%     |
| Heads              | --                                | --           | --                    | --     |
| Hallways           | 2,500                             | 49%          | 801,000               | 95%    |
| Vending            | 100                               | 2%           | 4,000                 | < 1%   |
| Other              | 50                                | 1%           | 500                   | < 1%   |
| TOTAL              | 5,150                             | 100%         | \$ 842,000            | 100%   |



# SPACE ENCLOSURES CEILING

## DESIGN CONSIDERATIONS

Holes are punched in suspended or plaster ceilings or ceiling tiles are knocked out or stolen. Ceiling tiles are burned with butane lighters.

## POSSIBLE DESIGN RESPONSES

1. Make ceilings of material that will not break when punched or hit with broomsticks, pool cues, etc. (*Material Selection*)
2. Replace damaged ceiling tiles as soon as damage occurs. (*Material Selection; Maintenance*)
3. Use ceiling tiles whose surface and composition are a homogenous color throughout so that a damaged tile surface will not expose another color that attracts attention. (*Material Selection*)
4. Raise height of ceilings beyond that of a 95 percentile male reach when jumping with arm extended. (Estimated at approximately 9'-6".) (*Building Design*)
5. Use ceiling tiles or ceiling system that has a flexible/impregnable surface, e.g.,
  - ceiling tiles with a plastic skin that flexes but won't break when hit;
  - highly resilient ceiling tiles which would be acoustically absorbent/flexible/homogenous coloring/flame proof/impregnable surface
 (*Building Design; Material Selection*)
6. Don't use a finished ceiling system. Leave conduit and plumbing exposed and color code in an attractive manner. (*Building Design*)
7. Remove ceiling tile hold-down clips which restrain tiles. This would prevent breakage when punched or poked with sticks. (*Maintenance*)

# DOORS

## INTRODUCTION

It is estimated that damage to doors accounted for approximately 23% of the cost of property damage in BEQs in 1976. The cost of repairing door damage is relatively high -- almost \$90 per incident. Therefore, although door damage represents about one tenth of all damage by frequency, it accounts for almost one fourth of all damage by cost.

As is shown in the table below, damage to the door itself or to the door frame accounts for the majority of the door damage (59%), and damage to door hardware accounts for another 38%. Damage to door louvers or vents, while a relatively insignificant fraction of door damage, is somewhat more costly to repair-- an average of \$132 per incident was reported.

| Element Damaged     | Est. No. of Incidents | % Incidents | Estimated Cost (1976) | % Cost | Cost per Incident |
|---------------------|-----------------------|-------------|-----------------------|--------|-------------------|
| Door and Door Frame | 11,000                | 59%         | \$ 932,000            | 55%    | \$ 83             |
| Door Hardware       | 7,000                 | 38%         | 694,000               | 41%    | 94                |
| Door Louver/Vent    | 500                   | 3%          | 74,000                | 4%     | 132               |
| TOTAL               | 19,000                | 100%        | \$1,700,000           | 100%   |                   |

# DOORS DOOR AND FRAME

## STATISTICS

It is estimated that approximately 11,000 incidents of damage to doors or door frames occurred in BEQs in 1976, costing almost \$1,000,000.

As is shown in the table below, damage to sleeping room doors and door frames accounted for almost 90% of the total cost of such damage, followed by that which occurred in lounges (5%) and hallways (4%).

## ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE TO DOORS AND DOOR FRAMES BY BEQ SPACE

| Location of Damage | Est. No. of Incidents (1976) | % Incidents | Estimated Cost (1976) | % Cost      |
|--------------------|------------------------------|-------------|-----------------------|-------------|
| Sleeping Rooms     | 8,900                        | 80%         | \$ 818,000            | 88%         |
| Lounges            | 800                          | 7%          | 50,000                | 5%          |
| Heads              | 50                           | .5%         | 3,000                 | .5%         |
| Hallways           | 700                          | 6%          | 40,000                | 4%          |
| Vending Areas      | --                           | --          | --                    | --          |
| Other              | 800                          | 7%          | 22,000                | 2%          |
| <b>TOTAL</b>       | <b>11,200</b>                | <b>100%</b> | <b>\$ 933,000</b>     | <b>100%</b> |

# DOOR AND FRAME

## DESIGN CONSIDERATIONS

1. Doors and door frames are broken when they are deliberately kicked.

This often occurs because people who have lost or forgotten their room keys don't ask (or cannot find) the Duty Manager to let them in.

## POSSIBLE DESIGN RESPONSES

1. Where solid core doors are specified, yet still damaged, replace with least expensive hollow core doors still compatible with hardware system. (With rigid solid doors, most force will be transmitted to hardware and frame, damaging them. Hollow core doors will flex and absorb force, or fail.) (*Material Selection*)
2. Consider usage of metal covered wood doors, or plastic laminate covered doors. (*Material Selection*)
3. Assign personnel to an "increased emphasis" door hardware maintenance program to reduce frequency of malfunctioning hardware. (*Maintenance*)
4. Consider use of combination locks (with a keyed or combination master over-ride) in rooms, especially those of permanent party tenants. Exploration of a microprocessor controlled credit card locking system should be made, as currently used in several U.S. hotels. (*Hardware Design*)
5. Alter keying procedures and controls to provide a convenient way for doors to be opened by a neutral party (custodial, security, BEQ management) at all times when personal keys have been lost or mislaid. (*BEQ Management; Hardware Design*)

# DOORS HARDWARE

## STATISTICS

It is estimated that slightly more than 7,000 incidents of damage to door hardware, (locks, hinges and door handles), occurred in 1976 costing almost \$700,000.

As with damage to doors and door frames, most damage to door hardware occurred in sleeping rooms.

## ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE TO DOOR HARDWARE BY BEQ SPACE

| Location of Damage | Est. No. of Incidents (1976) | % Incidents | Estimated Cost (1976) | % Cost      |
|--------------------|------------------------------|-------------|-----------------------|-------------|
| Sleeping Rooms     | 6,000                        | 81%         | \$ 654,000            | 94%         |
| Lounges            | 600                          | 8%          | 14,000                | 2%          |
| Heads              | --                           | --          | --                    | --          |
| Hallways           | 100                          | 1%          | 6,000                 | 1%          |
| Vending Areas      | --                           | --          | --                    | --          |
| Other*             | 700                          | 10%         | 20,000                | 3%          |
| <b>TOTAL</b>       | <b>7,400</b>                 | <b>100%</b> | <b>\$ 694,000</b>     | <b>100%</b> |

\* Represents damage to fire door hardware; and miscellaneous lost or damaged keys.

## HARDWARE

DESIGN CONSIDERATIONS

1. Door locks, latches, knobs and hinges are broken when doors are kicked or otherwise forced open. This usually occurs because people who have either forgotten or lost their room keys don't ask (or cannot find) the Duty Manager to let them in.
2. Keys are broken in door locks.
3. Fire exit door hardware, hydraulic closure mechanisms and latches are broken, often when access to the BEQ through fire doors is attempted.

POSSIBLE DESIGN RESPONSES

1. Install door hardware which will not break, thus opening the door when forcible entry is attempted. (*Hardware Design; Building Element Design*)
2. Alter keying procedures and controls to provide a convenient way for doors to be opened by a neutral party (custodial, security, BEQ Management) at all times when personal keys have been lost or mislaid. (*BEQ Management; Hardware Design*)

AND

**NOTE:** If, as many BEQ Managers reported, door hardware is broken when doors are forcibly opened, then kicking or forcing a door is obviously a known, successful and relatively fast way of entering a room without a key. If door hardware is strengthened so that attempts to force the doors are either unsuccessful or extremely time-consuming, then the attempts will probably stop.

3. On door locks, use inner cylinders which can be removed (by authorized personnel with special tools) and replaced without replacing the entire hardware set and outer cylinder. (*Hardware Design*)
4. Consider use of combination locks (with a keyed or combination master over-ride) in rooms, especially those of permanent party tenants. Exploration of a microprocessor controlled credit card locking system should be made, as currently used in several U.S. hotels. (*Hardware Design*)
5. Where solid core doors are specified, yet still damaged, replace with least expensive hollow core doors still compatible with hardware system. (With rigid solid doors, most force will be transmitted to hardware and frame, damaging them. Hollow core doors will flex and absorb force, or fail.) (*Material Selection*)

# HARDWARE

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DESIGN CONSIDERATIONS

POSSIBLE DESIGN RESPONSES

6. Assign personnel to an "increased emphasis" door hardware maintenance program to reduce frequency of malfunctioning hardware. (*Maintenance*)
7. Install acoustic alarms on fire doors to signal the duty desk and alarm the persons making unauthorized use of such doors. (*Hardware Design*)

# DOORS LOUVER OR VENT

## STATISTICS

It is estimated that approximately 500 incidents of damage to door louvers or vents occurred in BEQs in 1976, costing approximately \$148,000.

As is shown in the table below, while damage to sleeping room door louvers/vents accounts for 61% of all door louver/vent damage by frequency, it accounts for 95% of the total estimated cost of door louver/vent damage.

This is due to the high material costs reported for this category -- apparently those louvered doors in sleeping rooms which were damaged were entirely replaced.

## ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE TO DOOR LOUVERS OR VENTS BY BEQ SPACE

| <u>Location of Damage</u> | <u>Est. No. of Incidents (1976)</u> | <u>% Incidents</u> | <u>Estimated Cost (1976)</u> | <u>% Cost</u> |
|---------------------------|-------------------------------------|--------------------|------------------------------|---------------|
| Sleeping Rooms            | 300                                 | 61%                | \$ 70,000                    | 95%           |
| Lounges                   | --                                  | --                 | --                           | --            |
| Heads                     | --                                  | --                 | --                           | --            |
| Hallways                  | 200                                 | 39%                | 4,000                        | 5%            |
| Vending Areas             | --                                  | --                 | --                           | --            |
| Other                     | --                                  | --                 | --                           | --            |
| TOTAL                     | 500                                 | 100%               | \$ 74,000                    | 100%          |



# DOORS LOUVER OR VENT

## DESIGN CONSIDERATIONS

1. Vents, generally of sheet metal, are kicked in from the outside. No useful purpose for this action is assumed.

## POSSIBLE DESIGN RESPONSES

1. Where vents are damaged, replace with doors without vents, but undercut to provide some volume of air movement. (*Building Element Design; Maintenance*)

OR

Cover vents with exterior rigid plates and undercut doors. (*Building Element Design*)

2. Where undercuts are undesirable and solid core doors are to be specified, a geometric pattern of holes drilled through solid core doors at an angle of 30° down from the exterior face of the door will provide ventilation and privacy. (*Building Element Design*)

# WINDOWS

## INTRODUCTION

Damage to windows accounted for an estimated 13% of the cost of property damage in BEQs in 1976.

It is estimated that slightly more than 25,000 incidents occurred at a cost of almost \$951,000, or approximately \$37 per incident.

As is shown in the table below, damage to window screens accounted for 84% of the cost of all window damage. Damage to window glass accounted for about 15% and damage to window hardware or frames was negligible (1%).

| ELEMENT DAMAGED           | EST. NO. OF INC. (1976) | % INCI-DENTS | ESTIMATED COST (1976) | % COST | COST PER INC. |
|---------------------------|-------------------------|--------------|-----------------------|--------|---------------|
| Window Glass              | 2,900                   | 11%          | \$ 145,000            | 15%    | \$50          |
| Window Screen             | 22,200                  | 88%          | 801,000               | 84%    | 36            |
| Window Hardware/<br>Frame | 200                     | 1%           | 5,000                 | 1%     | 19            |
| TOTAL                     | 25,300                  | 100%         | \$ 951,000            | 100%   | \$37          |

# WINDOWS SCREENS

## STATISTICS

It is estimated that approximately 22,200 incidents of window screen damage occurred in 1976, costing approximately \$801,000.

Damage to window screens was reported in all BEQ locations except vending areas. However, 96% of the damage occurred in sleeping rooms.

| LOCATION OF DAMAGE | ESTIMATED NO. OF INCIDENTS (1976) | % INCI-DENTS | ESTIMATED COST (1976) | % COST |
|--------------------|-----------------------------------|--------------|-----------------------|--------|
| Sleeping Rooms     | 20,600                            | 93%          | \$ 767,000            | 96%    |
| Lounges            | 1,100                             | 5%           | 25,000                | 3%     |
| Heads              | 300                               | 1%           | 3,000                 | .5%    |
| Hallways           | 100                               | .5%          | 2,000                 | .5%    |
| Vending Areas      | N.R.                              | N.R.         | N.R.                  | N.R.   |
| Other              | 100                               | .5%          | 4,000                 | .5%    |
| TOTAL              | 22,200                            | 100%         | \$ 801,000            | 100%   |

# WINDOWS SCREENS

## DESIGN CONSIDERATIONS

Site visit discussions with sailors indicate that much screen damage is from the screens being pushed out or torn in order to throw marijuana or other illegal drugs out the window when sailors are suddenly interrupted for an inspection or by officers.

Additionally, screens appear to be poorly maintained, with many holes unrepaired and generally are of light-weight construction.

## POSSIBLE DESIGN RESPONSES

1. Install operable screens, such as those with a sub-frame in which the screen panel is top-hinged to pop or swing out at a touch. (Screens which roll down like a window shade are also commercially available.) (*Building Element Design*)
2. Use nylon or other screening material with high elasticity, which will deflect during hard contact and return to its shape thereby absorbing the energy which would normally tear the screen from its frame. (*Material Selection*)
3. Use heavy duty wire screens with heavy duty frames. (*Material Selection*)

## GLASS

STATISTICS

It is estimated that approximately 2,900 incidents of window glass damage occurred in 1976, costing approximately \$145,000.

Damage to window glass was reported in all BEQ locations. However, 98% of the damage (by cost) occurred in three places: hallways (50%), sleeping rooms (27%) and lounges (21%).

| LOCATION OF DAMAGE | ESTIMATED NO. OF INCIDENTS (1976) | % INCI-DENTS | ESTIMATED COST (1976) | % COST |
|--------------------|-----------------------------------|--------------|-----------------------|--------|
| Sleeping Rooms     | 900                               | 31%          | \$ 39,000             | 27%    |
| Lounges            | 900                               | 31%          | 30,000                | 21%    |
| Heads              | < 100                             | 1%           | 1,000                 | < 1%   |
| Hallways           | 1,000                             | 34%          | 72,000                | 50%    |
| Vending Areas      | < 100                             | 2%           | 2,000                 | 1%     |
| Other              | < 100                             | 1%           | 1,000                 | < 1%   |
| TOTAL              | 2,900                             | 100%         | \$ 145,000            | 100%   |

## WINDOWS

## GLASS

DESIGN CONSIDERATIONS

Window glass is broken in the following instances:

In lounges and game rooms, by billiard balls, air hockey pucks, etc.

In hallways and stairwells, by malicious actions or "horsing around".

In lower floors near outside recreation areas, by basketballs, baseballs, etc.

In rooms, by malicious actions or "horsing around". Analysis of the glass breakage patterns of one large northeast base shows that few, if any room windows are broken during the cold season, indicating that there is an instinct for thermal comfort.

POSSIBLE DESIGN RESPONSES

1. In lounges and game rooms, and in other selected high risk areas\* (near outside adjacent ball-playing areas) install 5.3 mm tempered glass. This thickness will resist most full body or projectile impacts. NOTE that the larger the pane of glass, the lower the probability of breakage for any given impact. (*Material Selection*)

OR

In these spaces, install Lexan or other poly-carbonate materials. (*Material Selection*)

2. Where outside recreation areas are adjacent to glazed areas, consider erection of chain link fencing or other decorative, protective screen between recreation area and glazing. (*BEQ Design*)

3. Jalousie windows seem to be particularly susceptible to damage either because of their complexity and fragility or because they are seen as being the same as are installed in penal institutions. They should not be specified and should be replaced with other window types as they are broken. (*Building Element Selection*)

\* Installing tempered glass or poly-carbonate in all windows is not a cost-effective method of preventing any malicious, or most accidental glass breakage.

# FIXED ATTACHMENTS & ELECTRICAL

## INTRODUCTION

The category of fixed attachments and electrical comprises the following building elements: lights, wires and conduits, switches and outlets, thermostats, speakers, exit lights, fire alarms, lawn sprinklers, and air conditioning and heating vents.

Damage to these elements accounted for approximately 9% of the cost of all property damage in BEQs in 1976. It is estimated that almost 32,000 incidents occurred, costing slightly more than \$686,000, or approximately \$22 per incident. However, this average cost per incident for the entire category is misleading: As is shown in the table on the following page, average costs varied widely depending on the specific element considered. The lowest average cost of repair reported was for exit lights (\$9 per incident) and the highest was for thermostats (\$83 per incident).

Also noted from the same table is that damage to only three of the nine elements accounts for approximately 90% of the damage to the entire category. (This is true on the basis of both frequency and cost.) On the basis of frequency, the three elements of major concern are lights (69%), sprinkler systems (13%), and switches and outlets (8%). On the basis of cost, the elements of major concern still include lights (50% of the cost) and sprinkler systems (15% of the cost), but thermostats

(24% of the cost) are now included, rather than switches and outlets which represent only 4% of the cost.

| Element Damaged      | Est. Number Incidents | % Incidents | Estimated Cost (1976) | % Cost | Cost/Incid. |
|----------------------|-----------------------|-------------|-----------------------|--------|-------------|
| Lights               | 22,000                | 69%         | \$ 349,000            | 50%    | \$16        |
| Wire and Conduit     | 24                    | 7.5%        | 2,000                 | .5%    | 78          |
| Switches and Outlets | 3,000                 | 8%          | 27,000                | 4%     | 11          |
| Thermostats          | 2,000                 | 6%          | 164,000               | 24%    | 83          |
| Speakers             | 60                    | 7.5%        | 2,000                 | .5%    | 37          |
| Exit Lights          | 200                   | 1%          | 2,000                 | .5%    | 9           |
| Fire Alarms          | 300                   | 1%          | 10,000                | 1%     | 38          |
| Sprinkler Systems    | 4,000                 | 13%         | 105,000               | 15%    | 25          |
| Air Conditioning     | 700                   | 2%          | 25,000                | 5%     | 35          |
| TOTAL                | 32,000                | 100%        | \$ 686,000            | 100%   |             |



## FIXED ATTACHMENTS &amp; ELECTRICAL

## LIGHTS

STATISTICS

It is estimated that almost 22,000 incidents of light damage occurred in BEQs in 1976, costing approximately \$348,000, or about \$16 per incident.

As is shown in the table below:

1. Most light damage (53% by cost) occurred in stairways or outside the BEQ (see Other in the table).
2. An additional 30% of light damage occurred in hallways.
3. Although damage to lights in sleeping rooms represents 19% of all light damage by frequency, it accounts for only 3% of all light damage by cost. This is because light bulbs were most frequently reported as damaged in sleeping rooms whereas more expensive light globes/lenses/covers and fixtures were usually reported as damaged in other BEQ spaces.

ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE  
TO LIGHTS BY BEQ SPACE

| Location of Damage | Est. No. of Incidents (1976) | % Incidents | Estimated Cost (1976) | % Cost |
|--------------------|------------------------------|-------------|-----------------------|--------|
| Sleeping Rooms     | 4,200                        | 19%         | \$ 10,000             | 3%     |
| Lounges            | 1,100                        | 5%          | 28,000                | 8%     |
| Heads              | 1,500                        | 6%          | 20,000                | 6%     |
| Hallways           | 6,100                        | 28%         | 105,000               | 30%    |
| Vending Areas      | --                           | --          | --                    | --     |
| Other              | 9,100                        | 42%         | 185,000               | 53%    |
| TOTAL              | 22,000                       | 100%        | \$ 348,000            | 100%   |

# LIGHTS

## DESIGN CONSIDERATIONS

1. Light bulbs are broken. (At least two bases reported this as a daily occurrence.)
2. Light globes and covers are broken, generally in stairways or outside the building, but also quite frequently in hallways.
3. Light fixtures are ripped out, generally in stairways or outside the building, but also quite frequently in hallways.

## POSSIBLE DESIGN RESPONSES

- 1.1 Institute a continuous re-lamping program to counter the snowball-effect of dark hallways from both bulb breakage and the reduction of the number of operating fixtures from energy saving programs. (*Maintenance*)
- 2.1 Consider use of unbreakable or other polycarbonate materials for globes and lenses in critical areas. (*Material Selection*)
- 2.2 Night light shades are frequently used as ashtrays. Purchase and disseminate inexpensive plastic ashtrays to rooms, one per occupant and several per lounge in Welton-Beckett model BEQs. (*BEQ Furnishings Selection*)

# FIXED ATTACHMENTS & ELECTRICAL LAWN SPRINKLERS

## STATISTICS

It is estimated that slightly more than 4,000 incidents of damage to sprinkler systems occurred in BEQs in 1976. The estimated cost of this damage is almost \$105,000, or about \$26 per incident.

Most of the damage (97%) was sustained by lawn sprinkler systems, three bases reported that their systems are damaged daily, and one base has a person working full-time to repair only the lawn sprinkler system.

Reported damage to interior sprinkler systems for fire protection was minimal.

## ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE TO SPRINKLER SYSTEMS BY BEQ SPACE

| Location of Damage | Est. No. of Incidents (1976) | % Incidents | Estimated Cost (1976) | % Cost |
|--------------------|------------------------------|-------------|-----------------------|--------|
| Sleeping Rooms     | N.R.                         | -           | \$ -                  | -      |
| Lounges            | N.R.                         | -           | -                     | -      |
| Heads              | N.R.                         | -           | -                     | -      |
| Hallways           | 100                          | 3%          | 3,100                 | 3%     |
| Vending            | N.R.                         | -           | -                     | -      |
| Other              | 4,000                        | 97%         | 101,500               | 97%    |
| TOTAL              | 4,100                        | 100%        | \$ 104,600            | 100%   |

# FIXED ATTACHMENTS & ELECTRICAL LAWN SPRINKLERS

## DESIGN CONSIDERATIONS

1. Lawn sprinkler heads are broken or stolen.

## POSSIBLE DESIGN RESPONSES

1. 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.) (*Hardware Design*)
2. It is possible that lawn sprinklers, of both the fixed and pop-up type, are stolen for re-use in home lawns or for resale for such private residence use. To prevent this, it is recommended that lawn sprinkler systems using fewer, larger heads covering larger areas (such as those used for golf courses and recreational areas) be specified. These larger heads cannot be easily utilized in smaller residential systems. (*Hardware Design*)

FIXED ATTACHMENTS & ELECTRICAL  
**THERMOSTATS**

STATISTICS

It is estimated that almost 2,000 incidents of damage to thermostats occurred in BEQs in 1976, costing slightly more than \$165,000, or approximately \$83 per incident.

As expected, most damage to thermostats occurred in sleeping rooms (86%), followed by an additional 10% in hallways.

ESTIMATED ANNUAL FREQUENCY AND COST OF DAMAGE TO THERMOSTATS BY BEQ SPACE

| LOCATION OF DAMAGE | EST. NO. OF INCIDENTS (1976) | % INCI-DENTS | ESTIMATED COST (1976) | % COST      |
|--------------------|------------------------------|--------------|-----------------------|-------------|
| Sleeping Rooms     | 1,700                        | 86%          | \$ 135,000            | 82%         |
| Lounges            | 70                           | 3%           | 8,000                 | 5%          |
| Heads              | --                           | --           | --                    | --          |
| Hallways           | 200                          | 10%          | 22,000                | 13%         |
| Vending            | --                           | --           | --                    | --          |
| Other              | 20                           | 1%           | 200                   | .5%         |
| <b>TOTAL</b>       | <b>2,000</b>                 | <b>100%</b>  | <b>\$ 165,000</b>     | <b>100%</b> |

# THERMOSTATS

## DESIGN CONSIDERATIONS

1. Thermostats are kicked loose or ripped off walls.
2. Thermostat covers are broken or removed.
3. Thermostat controls are tampered with and switches/settings are broken.

NOTE: Several BEQ Managers attribute their actions to frustration. In some BEQs, as in many other institutional residences, heat is only turned on a couple of months a year, regardless of the weather. In other instances, the heating and cooling system malfunctions, and delivers an inappropriate temperature response to the space.

## POSSIBLE DESIGN RESPONSES

Individual room controls are not necessary in sleeping rooms and removal of thermostats and centralization of controls should be considered. Such controls should set temperatures at the most comfortable levels consonant with energy directives. Military servicemen and women, through their age group, physical stature and health maintenance are, as a group least likely to require abnormal temperature settings such as often is needed by the elderly or demanded by the very thin or the very fat. Special attention should be given to the user's activity patterns in very hot or very cold climates. A recent study of military personnel in Alaska showed that a major complaint was that the room interiors were stifflingly hot.\*

Removal of thermostats was recommended by several Commanding Officers.

Although BEQ residents were not surveyed in this study, a survey of over 1600 Army BEQ residents found the following:

\* CERL/by Ledbetter & Bechtel

FIXED ATTACHMENTS & ELECTRICAL

# THERMOSTATS

DESIGN CONSIDERATIONS

POSSIBLE DESIGN RESPONSES

"...respondents were asked to select four items from a list of ten building features that might be provided in new barracks... By far the most desirable item was all-season temperature control..."\* (BOSTI's underline)

\* Brauer, Roger L., Survey of Soldiers' Attitudes Toward Troop Housing, Volume II. Technical Report D-29. Construction Engineering Research Laboratory, April 1975, p. 51.

# FURNISHINGS

## INTRODUCTION

Damage to furnishings\* accounted for an estimated 13% of the cost of property damage in BEQs in 1976.

It is estimated that slightly more than 31,000 incidents occurred at a cost of over \$960,000, or approximately \$31 per incident.

As shown in the table on the following page, damage to only three of the thirteen items classified as furnishings accounted for almost 80% of the cost of damage to all furnishings. They are sofas and chairs, lockers, and curtains and blinds, representing, respectively, 38%, 24% and 16% of the cost of damage to furnishings.

These same three items accounted for 73% of the damage to furnishings by frequency.

\*Furnishings include lockers, lamps, unattached rugs, T.V.s, beds, sofas and chairs, linens and towels, tables, desks, recreation equipment, curtains and blinds, signage and Bulletin Boards and ash receivers.



| Element Damaged             | Est. Annual No. of Inc. | % Incidents    | Estimated Cost(1976) | % Cost      | Cost per Incident |
|-----------------------------|-------------------------|----------------|----------------------|-------------|-------------------|
| Lockers                     | 10,200                  | 33%            | \$ 233,000           | 24%         | \$23              |
| Lamps                       | 2,000                   | 6%             | 63,000               | 6%          | 32                |
| Rugs (Unattached)           | N.R.                    | N.R.           | N.R.                 | N.R.        | --                |
| T.V.s                       | 600                     | 2%             | 32,000               | 3%          | 57                |
| Beds                        | 100                     | 0%             | 9,000                | 1%          | 69                |
| Sofas and Chairs            | 9,200                   | 30%            | 369,000              | 38%         | 40                |
| Linens and Towels           | 3,700                   | 12%            | 53,000               | 5%          | 14                |
| Tables                      | 200                     | 1%             | 9,000                | 1%          | 42                |
| Desks                       | N.R.                    | N.R.           | N.R.                 | N.R.        | --                |
| Recreation Equipment        | 500                     | 2%             | 5,000                | 1%          | 10                |
| Curtains and Blinds         | 3,000                   | 10%            | 150,000              | 16%         | 51                |
| Signage and Bulletin Boards | 300                     | 1%             | 3,000                | 0%          | 12                |
| Ash Receivers               | 1,300                   | 4%             | 34,000               | 4%          | 27                |
| <b>TOTAL</b>                | <b>31,100</b>           | <b>≈ 100%*</b> | <b>\$ 960,000</b>    | <b>99%*</b> |                   |

\*Errors are due to rounding.

## FURNISHINGS

## SOFA AND CHAIR

STATISTICS

It is estimated that approximately 9,000 incidents of sofa and chair damage occurred in 1976, costing approximately \$369,000.

As expected, 99% of all damage to sofas or chairs occurred in sleeping rooms and lounges, with the majority (81%) occurring in lounges.

| Location of Damage | Est. No. of Incidents (1976) | % Incidents | Estimated Cost (1976) | % Cost |
|--------------------|------------------------------|-------------|-----------------------|--------|
| Sleeping Rooms     | 1,700                        | 18%         | \$ 53,000             | 14%    |
| Lounges            | 7,500                        | 81%         | 314,000               | 85%    |
| Heads              | N.R.                         | --          | N.R.                  | --     |
| Hallways           | N.R.                         | --          | N.R.                  | --     |
| Vending Areas      | 8                            | .5%         | 1,000                 | .5%    |
| Other              | 60                           | 1%          | 1,000                 | .5%    |
| TOTAL              | 9,300                        | 100%        | \$ 369,000            | 100%   |

# SOFA AND CHAIR

## DESIGN CONSIDERATIONS

1. Chair legs and backs are broken.  
Several BEQ Managers felt that chairs are usually damaged unintentionally -- that they break during normal use because their original construction was flimsy or because they are very old.
2. Chairs are occasionally thrown out of windows.
3. Upholstered chair and sofa cushions are slashed or burned.

## POSSIBLE DESIGN RESPONSES

- 1.1 Purchase chairs with as few components as possible and whose joints will not weaken with age. For example, plastic moulded chairs with metal frames. Or purchase chairs of sturdy but simple wood construction which may be easily repaired with hide glue and clamps by maintenance staff. (*Furniture Design*)
- 2.1 Purchase chairs which are too heavy or large to pick up and throw around or through a window. (Such chairs should have casters so that they can easily be moved for cleaning.) (*Furniture Design*)
- 3.1 Purchase sofas and chairs which are designed with a frame independent of the upholstered cushions and purchase an extra-inventory of modular cushions or upholstery fabric... have cushions with removable or zip off covers. (*Furniture Design*)
- 3.2 Permit women to have visitation rights to lounges where they may be entertained. Several BEQ Managers have noted the "civilizing" effect on environment of this procedure. (*Policy and Management*)

FURNISHINGS  
**LOCKERS**

STATISTICS

It is estimated that approximately 10,000 incidents of locker damage occurred in 1976, costing approximately \$233,000.

As expected, all locker damage occurred in sleeping rooms.

# LOCKERS

## DESIGN CONSIDERATIONS

1. Locker doors are pried open or broken because keys are lost (one base reported that this occurred daily). It has been demonstrated that newer door panels are quite flexible and suggest such entry.
2. Locker hasps, hinges and locks are broken.

## POSSIBLE DESIGN RESPONSES

- 1.1 Design lockers so that they cannot be pried open without special tools or assistance; or so that prying them open takes considerably longer than would getting someone with a master key to open the locker. (*Furniture Design*)
- 1.2 Design lockers with built-in combination or push-button locks rather than key locks. In order to be effective, the lock code should be changeable and should be coded to a number the user can easily remember, such as part of his Social Security number or his birthdate. (*Furniture Design*)
- 1.3 Require a security deposit from each BEQ resident, (upon taking occupancy of the room), which is sufficient to cover damage to those furnishings for which he is personally responsible. Return the deposit only when the resident checks out and the room has been inspected. (*BEQ Management and Policy*)
- 1.4 Stiffen locker door panels so they are very rigid and don't permit sufficient leverage to be gained in prying them open. (*Furniture Design*)

FURNISHINGS  
**CURTAINS AND BLINDS**

STATISTICS

It is estimated that approximately 3,000 incidents of damage to curtains and blinds occurred in 1976, costing approximately \$150,000.

97% of this damage occurred in sleeping rooms, while the remaining 3% occurred in lounges.

| Location of Damage | Est. No. of Incidents (1976) | % Incidents | Estimated Cost (1976) | % Cost      |
|--------------------|------------------------------|-------------|-----------------------|-------------|
| Sleeping Rooms     | 2,900                        | 97%         | \$ 145,000            | 96%         |
| Lounges            | 100                          | 3%          | 6,000                 | 4%          |
| Heads              | --                           | --          | --                    | --          |
| Hallways           | --                           | --          | --                    | --          |
| Vending Areas      | --                           | --          | --                    | --          |
| Other              | --                           | --          | --                    | --          |
| <b>TOTAL</b>       | <b>3,000</b>                 | <b>100%</b> | <b>\$ 151,000</b>     | <b>100%</b> |

# CURTAINS AND BLINDS

## DESIGN CONSIDERATIONS

1. Venetian blinds are hard to clean, have too many moving parts and break easily even when properly operated.
2. Curtains are pulled down off the curtain rods or curtain rods themselves are pulled down.  
Some BEQ Managers reported that the initial installation of curtain rods is often shoddy, and that they come down even when drapes are correctly opened and closed.

## POSSIBLE DESIGN RESPONSES

- 1.1 Replace venetian blinds with heavy, durable, decorative shades or shutters. (*Furniture Design; Material Selection*)
- 2.1 Replace curtains with heavy, durable, decorative shades or shutters. (*Furniture Design; Material Selection*)  
OR
- 2.2 Where curtains are still used, ensure that rods are correctly installed and screwed into firm backings, (such as wall studs). (*Construction Methods*)  
AND
- 2.3 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. (*Furniture Design*)  
AND
- 2.4 Install curtains which cannot be removed or accidentally pulled off the curtain rod without removing the rod itself. (*Furniture Design*)

# SERVICE EQUIPMENT

## INTRODUCTION

Damage to service equipment\* accounted for an estimated 16% of the cost of property damage in BEQs in 1976.

It is estimated that slightly more than 16,000 incidents occurred at a cost of over \$970,000, or approximately \$61 per incident.

As is shown in the table on the following page, damage to only two of the seven items classified as service equipment accounted for almost 90% of the cost of damage to all service equipment. The two items are vending machines (61% of the cost) and washing machines and dryers (27% of the cost). These same two items account for 72% of the damage to service equipment by frequency.

It should be noted that damage to fire extinguishers accounted for approximately 21% of the damage by frequency, but for only 6% of the damage by cost. Although this cost is relatively low, caused mainly by inappropriate discharging of extinguishers, the problem is addressed in the design guidelines because of the potential danger of a fire occurring when no working extinguishers are available. This is critical because of the high frequency of unusable fire extinguishers seen in older, wood buildings (used transients) seen in the project site visits.

\*Service equipment includes phones and booths, washing machines and dryers, vending machines, coin changers, vacuums and buffers, water fountains and fire extinguishers.



| Element Damaged             | Est. No. of Incidents | % Incidents | Estimated Cost (1976) | % Cost | Cost per Incident |
|-----------------------------|-----------------------|-------------|-----------------------|--------|-------------------|
| Phones and Booths           | 1,000                 | 6%          | \$ 42,000             | 4%     | \$43.             |
| Washing Machines and Dryers | 3,800                 | 24%         | 259,000               | 27%    | 67                |
| Vending Machines            | 7,600                 | 48%         | 592,000               | 61%    | 78                |
| Coin Changers               | 100                   | .5%         | 1,000                 | .5%    | 13                |
| Vacuums and Buffers         | 100                   | 1%          | 6,000                 | 1%     | 57                |
| Fountains                   | 100                   | 1%          | 11,000                | 1%     | 125               |
| Fire Extinguishers          | 3,300                 | 21%         | 60,000                | 6%     | 18                |
| TOTAL                       | 16,000                | 100%        | \$ 970,000            | 100%   | \$ 61             |

# SERVICE EQUIPMENT VENDING MACHINES

## STATISTICS

It is estimated that almost 8,000 incidents of vending machine damage occurred in 1976, costing almost \$592,000.

As expected, 97% of all damage to vending machines occurred in designated vending areas. However, vending machines are sometimes located in lounges, T.V. or recreation rooms, and are damaged in these spaces also.

| LOCATION OF DAMAGE | ESTIMATED NO.<br>OF INCIDENTS | %<br>INCIDENTS | ESTIMATED<br>COST (1976) | %<br>COST   |
|--------------------|-------------------------------|----------------|--------------------------|-------------|
| Sleeping Rooms     | N.A.                          | N.A.           | N.A.                     | N.A.        |
| Lounges            | 200                           | 3%             | \$ 7,000                 | 1%          |
| Heads              | N.A.                          | N.A.           | N.A.                     | N.A.        |
| Hallways           | N.A.                          | N.A.           | N.A.                     | N.A.        |
| Vending            | 7,400                         | 97%            | 585,000                  | 99%         |
| Other              | Neg.*                         | Neg.           | Neg.                     | Neg.        |
| <b>TOTAL</b>       | <b>7,600</b>                  | <b>100%</b>    | <b>\$592,000</b>         | <b>100%</b> |

\* Negligible amount of damage.

# VENDING MACHINES

## DESIGN CONSIDERATIONS

Damage to vending machines occurs when:

1. Coat hangers are used in an attempt to get free food.
2. Machines are turned face down and shaken to release all snacks.
3. Vending machine plugs are removed from wall sockets which results in melted ice-cream, cold coffee and warm beer.
4. Machines are kicked and hammered in an attempt to get the purchase, a refund or change due.

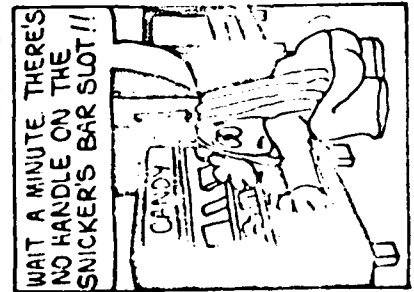
## POSSIBLE DESIGN RESPONSES

NOTE: Although some damage to vending machines occurs when people deliberately try to get items without paying, almost all BEQ Managers are of the opinion that most vending machine damage occurs because the machine malfunctions. The most frequent complaints about vending services are:

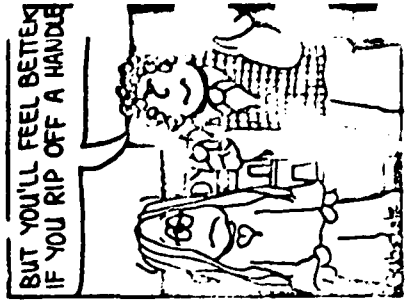
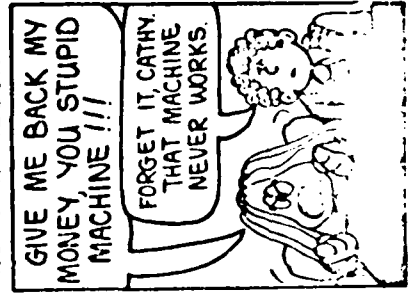
1. Machines are not kept filled, especially on weekends.
2. Machines frequently malfunction by not providing the purchase, a refund or change due.
3. It takes a long time to get malfunctioning machines fixed.
4. The prices of the items are very high.

As the comic strip below shows, vandalizing vending machines out of frustration is not a problem unique to Naval BEQs.

## "VENDING MACHINES AND VANDALISM"



CATHY



# VENDING MACHINES

## DESIGN CONSIDERATIONS

## POSSIBLE DESIGN RESPONSES

1. Centralize the location of vending machines so that they are in sight of passers-by or the front desk. For example, the vending area could be part of, or directly adjacent to, the lounge areas. This would increase not only the natural surveillance, but also the social amenities available in the lounge. This must be accompanied by an increase in trash receptacles in the lounges, and by better housekeeping practices. (*BEQ Design, BEQ Policy and Management*)
2. Provide for 24-hour, instant refund at the front desk. (*BEQ Policy and Management*)
3. Construct protective covers on vending machine islands which restrict movement of machines and any other type of tampering but which permit access to coin slots, selector buttons and purchases. (*Hardware Design*)
4. Install electrical sockets for vending machines below the floors, designed to resist accidental damage and unauthorized unplugging. (*Hardware Design*)

# VENDING MACHINES

## DESIGN CONSIDERATIONS

## POSSIBLE DESIGN RESPONSES

5. It is our understanding that vending service is contracted out rather than provided directly by the Navy. We therefore recommend that the following provisions be included in the Navy's contracts with service providers. (*BEQ Policy and Management*)
  - a. Only those machines which have been proven sturdy and reliable under the expected volume of use in BEQs should be installed. (The BEQ population and its use of vending machines is probably very similar to that of college dormitories. Any vending service and machines which have been reliable in a large dorm will probably be reliable in a Naval BEQ.)
  - b. Machines must be kept adequately stocked at all times. Machines should be restocked before they are empty.
  - c. Machines should be repaired within a few hours of reported malfunctioning.
  - d. Vendors who include a preventive maintenance service for their machines should be given preference.
6. In very large BEQs which are almost continuously occupied, explore alternatives to vending machines:
  - a. A contract "food cart" service which comes around at appointed times on evenings and weekends. (*BEQ Policy and Management*)
  - b. A BEQ snack bar. (*BEQ Design, BEQ Policy and Management*)

## SERVICE EQUIPMENT

## WASHERS &amp; DRYERS

STATISTICS

It is estimated that almost 4,000 incidents of washer and dryer damage occurred in 1976, costing approximately \$259,000.

As is shown in the table below, washers and dryers are located in various places in BEQs. Some were reported as being in heads (we assume these are small laundry rooms adjacent to common heads on each deck). Others were reported in vending areas (we assume snack machines and laundry facilities were in the same area). The majority are located in laundry rooms.

| Location of Damage | Est. No. of Incidents | % Incidents | Estimated Cost (1976) | % Cost |
|--------------------|-----------------------|-------------|-----------------------|--------|
| Sleeping Rooms     | N.A.                  | N.A.        | N.A.                  | N.A.   |
| Lounges            | N.A.                  | N.A.        | N.A.                  | N.A.   |
| Heads              | 400                   | 11%         | \$ 27,000             | 11%    |
| Hallways           | N.A.                  | N.A.        | N.A.                  | N.A.   |
| Vending            | 200                   | 5%          | 14,000                | 5%     |
| Other              | 3,200                 | 84%         | 218,000               | 84%    |
| TOTAL              | 3,800                 | 100%        | \$259,000             | 100%   |

# WASHERS & DRYERS

## DESIGN CONSIDERATIONS

1. Knobs for machine operation entirely removed.
2. Lint filters and clothes dryer screens are torn.
3. Debris is left in machines

## POSSIBLE DESIGN RESPONSES

NOTE: Although some washer and dryer damage is probably deliberate, the types of damage reported and the comments of BEQ Managers indicate that much of the damage is due to incorrect operation of, and subsequent tampering with the machines; and to the lack of an adequate preventive maintenance program. It is therefore recommended that:

1. Heavy duty, reliable machines, such as the smallest available industrial models be installed. The machines should have a minimum number of simply-operated controls, and the controls should be designed so that they cannot be removed without special tools. Clear, simply written instructions for machine operation should be printed on the machines. (*Equipment Design*)
2. In large BEQ complexes, centralize one or two laundry facilities within the complex and have an attendant there during peak use periods. The attendants should be able to perform preventive maintenance and minor repairs. (*BEQ Site Planning; BEQ Design; BEQ Policy, Management and Maintenance.*)
3. In smaller BEQ's, centralize the machines within the BEQ, within sight of passers-by or the front desk. (*BEQ Design*)
4. In all laundry facilities, install one or two more washers and dryers than are expected to be used during peak periods. Then, if a machine malfunctions, users will not be tempted to try and fix it and will use another machine. (*BEQ Design*)

# WASHERS & DRYERS

DESIGN CONSIDERATIONS

POSSIBLE DESIGN RESPONSES

5. High-use performance specifications for washer-dryers should be added to washer/dryer contracts where bases contract out laundry machine service.



## SERVICE EQUIPMENT

## FIRE EXTINGUISHERS

STATISTICS

It is estimated that approximately 3,000 incidents of damage to fire extinguishers occurred in 1976, costing approximately \$60,000.

Damage to fire extinguishers was reported only in BEQ hallways, accounting for about 13% of the total cost of hallway vandalism to the Navy, and a per incident cost of about \$20.00.

# FIRE EXTINGUISHERS

## DESIGN CONSIDERATIONS

Fire extinguishers are torn off wall mountings and contents emptied.

## POSSIBLE DESIGN RESPONSES

Any design response which would seek to strengthen wall mountings or put fire extinguishers out of reach would negate their purpose -- that is, to be easily removable and useable in case of fire. Therefore, the only two appropriate responses to vandalism of fire extinguishers are:

1. Install fire extinguishers which, when used, immediately set off a loud alarm. (*Building and Element Design*)

## AND

2. Respond administratively to the dangerousness of vandalism of fire extinguishers by strong punishment for vandals, when apprehended, and constant reference to the danger of such acts through the base newspaper and other channels. (*BEQ Policy and Management*)

# BATHROOM (HEAD)

## INTRODUCTION

Damage to bathroom elements and fixtures accounted for an estimated 8% of the cost of property damage in BEQs in 1976.

It is estimated that almost 33,000 incidents occurred at a cost of approximately \$592,000, or about \$18 per incident. This average cost of repair per incident is somewhat misleading. As is shown on the table on the following page, average cost of repair varied widely with the specific element considered. The lowest cost reported (\$9 per incident) was for repairing/replacing shower heads. Therefore, although damage to shower heads accounts for 24% of all bathroom damage by frequency, it represents only 12% of the damage by cost. The highest cost reported (\$59 per incident) was for partitions. Therefore, although damage to partitions accounts for only 3% of all bathroom damage by frequency, it represents 10% of the damage by cost.

Damage to only five of the eleven bathroom fixtures accounts for 76% of the total cost of bathroom fixture damage. The elements are: urinals (30%), paper holders (15%), shower heads (12%), partitions (10%) and sinks (9%).

| ELEMENT DAMAGED              | ESTIMATED<br>NUMBER OF<br>INCIDENTS | %<br>INCI-<br>DENTS | ESTIMATED<br>COST<br>(1976) | %<br>COST | COST<br>PER<br>INC. |
|------------------------------|-------------------------------------|---------------------|-----------------------------|-----------|---------------------|
| Sinks                        | 2,000                               | 6%                  | \$ 56,000                   | 9%        | \$ 27               |
| Toilets                      | 2,000                               | 6%                  | 40,000                      | 7%        | 22                  |
| Partitions                   | 1,000                               | 3%                  | 60,000                      | 10%       | 59                  |
| Mirrors                      | 3,000                               | 9%                  | 44,000                      | 7%        | 18                  |
| Shower Heads                 | 8,000                               | 24%                 | 71,000                      | 12%       | 9                   |
| Faucets, Pipes<br>and Drains | 1,000                               | 3%                  | 32,000                      | 5%        | 29                  |
| Soap Tray/Dispenser          | 400                                 | 1%                  | 16,000                      | 3%        | 43                  |
| Shelving                     | 8                                   | .5%                 | 400                         | .5%       | 47                  |
| Paper Holder                 | 5,000                               | 15%                 | 89,000                      | 15%       | 17                  |
| Urinal                       | 10,100                              | 31%                 | 180,432                     | 30%       | 18                  |
| Shower Curtain               | 200                                 | 1%                  | 3,000                       | 1%        | 11                  |
| TOTAL                        | 32,708                              | 99.5%               | \$ 591,832                  | 99.5%     | \$18                |

# BATHROOM (HEAD) URINALS

## DESIGN CONSIDERATIONS

1. Urinal hardware is broken or removed
2. Urinals are constantly clogged with paper towels, etc..

## POSSIBLE DESIGN RESPONSES

NOTE: Damage to urinals is the single most costly item of head damage -- slightly more than \$180,000 per year, or about 30% of the total. Most of the cost is labor for clearing clogged urinals and cleaning up the mess when they overflow.

The problem with urinals occurs largely in large common heads. Toilets rather than urinals are installed in private heads. The opinion shared by many BEQ managers is that urinals are deliberately clogged to make more work for the cleaners.

1. Install urinals whose hardware cannot be removed without special tools or which takes a long time to remove. (*Hardware Design*)
2. Replace paper towel dispensers in common heads with cloth roll towels. (Electric hand dryers are another alternative to paper towels, but some BEQ managers feel they are too costly, use too much electricity and have too much down time. (*Hardware Design*))
3. Design urinals so that they are difficult to clog but easy to clear when clogging occurs. (*Plumbing; Fixture Design*)
4. Eliminate large, common heads. (*BEQ Policy, BEQ Design*)

# BATHROOM (HEAD) PAPER HOLDER

## DESIGN CONSIDERATIONS

1. Toilet paper holders are either entirely ripped from walls or some of their components are broken or removed.

## POSSIBLE DESIGN RESPONSES

1. Specify methods of anchoring toilet paper holders to walls which will withstand the maximum pulling forces of a 95th percentile male. (*Hardware Design, Construction Methods*)
2. Design toilet paper holders which, because of their configuration, do not allow the application of forces sufficient to tear them from the wall. (*Hardware Design*)
3. Design toilet paper holders so that the component most likely to be grabbed in an attempt to remove or break the holder is one which will break without damaging the remainder of the fixture, is very inexpensive and is simply and quickly replaced. Keep extra components in stock so that those which are damaged may be replaced immediately. (*Hardware Design, Maintenance*)
4. Eliminate large, common heads. (*BEQ Design, BEQ Policy*)

## BATHROOM (HEAD) SHOWER HEAD

### DESIGN CONSIDERATIONS

1. Shower heads are accidentally damaged when adjustment of the direction or pressure of water flow is attempted.
2. Shower heads are stolen.

*(Some BEQ Managers feel that shower heads are badly designed and cheaply constructed and therefore cannot withstand normal operation.)*

### POSSIBLE DESIGN RESPONSES

1. Install high quality, durable shower heads which allow for some change in the direction of water flow. Individual adjustments in water pressure should be unnecessary if the plumbing system operates correctly. (*Hardware Design, Plumbing System Design*)
2. Install shower heads which cannot be removed without special tools. (*Hardware Design*)
3. Purchase shower heads which are inexpensive and easy to replace. Keep a supply in stock for immediate replacement when broken or stolen. (*Hardware Design, BEQ Maintenance*)

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## ADMINISTRATIVE GUIDELINES

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### 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 project findings show 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.
2. Every attempt should be made to minimize the size and frequency of movement of transient populations from base to base



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ADMINISTRATIVE GUIDELINES -- Cont.

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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.

In addition to these recommendations, the project has identified four areas for which Administrative Guidelines have been developed. These are:

- A. Problems with Repairs and paying for repairs.
- B. Problems with BEQ management.
- C. Problems with security and patrols.
- D. Problems with communication and orientation.

On the following pages, each problem is discussed first, followed by a set of recommendations or guidelines relating to the problems.

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ADMINISTRATIVE GUIDELINES -- Cont.

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A. Problems with Repairs and Paying for Repairs

1. Tenant command vandalism: The current relationship between host and tenant commands and the Naval treasury penalizes host commands which extend efforts to catch vandals in tenant commands. Even if the tenant command admits/assumes responsibility and pays the treasury directly for the cost of the incident, the host command must still pay for the investigation and repair the damage out of its current funds.
  
2. The alternative to Captain's Mast...personal restitution: Many bases permit identified vandals to make the repair themselves as an alternative to going to mast. Site visits verify that much of the work performed in this manner is shoddy. While this does get repairs done with no financial burden to the Command, it has the side effect of lowering habitability. Since less than 5% of perpetrators are ever apprehended, Navywide, this is not a major problem. But if increased watch and increased willingness to turn in a vandal by other sailors were to happen, then this method of repair would increase. It is not recommended.
  
3. Public Works Repairs: Public Works' repair charges are seen as expensive by most C.O.s and whenever possible, Public Works is not used...especially on large bases. Further, Public Works is reported as "saving up" repair requests for a period until a large enough number is reached to justify an effort. During this interim period, habitability is lowered and an unintentional message is sent to the inhabitants about lack of care for facilities.

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 ADMINISTRATIVE GUIDELINES -- Cont.
 

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Many bases carry extensive, long-term discrepancies lists (one base had 8 years' worth) and the repairs are simply not made. This lowers habitability.

4. Budgetting for vandalism and/or anti-vandalism efforts: The project team received bottom-line totals for M & O budgets from most bases...and also received frequencies and costs for vandalism from most bases. 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.

This is only possible under the following conditions:

- a. Repairs to damage are not made and the damaged element is removed from service (along with the service it provided). The long term effect of this is a degradation of environment. There is some evidence that this is a common practice whose goal is to attain the \$50,000 minimum to request funds from MCON and avoid making repairs out of base funds.
- b. Repairs to damage are made, but by base maintenance people or by "unofficial" use of technical ratings acting as repair teams. Extensive use of Comshaw was seen on several bases. Many bases reported daily repair of items, many of which are simply never recorded as property damage or vandalism, as they are repaired as a matter of course. These costs would not show up as M & O costs.
- c. The frequencies and/or costs of vandalism were incorrectly reported. Costs were averaged from a set of frequent incidents as reported by 34 Public Works centers. These were remarkably similar and are believed accurate. Frequencies were reported directly by C.O.s and separately by BEQ Managers and are believed accurate.
- d. C.O.'s could have misrepresented 4 years' worth of M & O budgets. We believe this is not the case.

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 ADMINISTRATIVE GUIDELINES -- Cont.
 

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Both a. and b. above happen frequently at bases. Misreporting or inaccuracy is believed minimal. But there is a serious problem in the preparation of base M & O budgets or in their review and funding by the Navy. The bases are seriously under-budgetted or underfunded or both, undermining serious attempts to combat vandalism.

5. Any reduction of habitability is unacceptable...because it reduces Naval capacity to compete with civilian alternatives for skilled manpower and it increases turnover which in turn, increases Naval expenditures for the cost to train a replacement.

This is well documented in a number of DOD studies: For example, the DOD Task Force Study in 1966 of 14,000 men and their officers, found:

Housing was one of the most important reasons for leaving the service...one of the least important for staying.

And the Army/CERL Study in 1972-74 of 2,000 men, found:

90% of the men want to live off base...ranked poorly were:

- . Repairs which took a long time
- . Low quality of sleeping spaces (temperature, noise, privacy)
- . Low quality of toilets (cleanliness, privacy, odor)

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ADMINISTRATIVE GUIDELINES -- Cont.

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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. Less feasible would be a mechanism which has the tenant command make the repairs or pay Public Works to do it.
2. Repairs done by perpetrators as an alternative to, or as a result of, going to Captain's Mast should be done by Public Works or a qualified local contractor, paid for by the perpetrator. As little repair as possible should be done by unskilled people.
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 bases. Simultaneously, C.O.s and their budget preparation staff must clearly understand the cost of vandalism on their bases and budget accordingly. This also 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. Better record keeping of property damage on bases would be useful in accurate budget preparation and budget justification.
5. Every attempt should be made to facilitate 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.

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ADMINISTRATIVE GUIDELINES -- Cont.

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B. Problems with BEQ Management

1. The following profile of the current BEQ Managers is constructed from data from over 250 BEQ Manager responses to an extensive questionnaire.

The average BEQ Manager:

- . Has short job tenure...74% have been in their positions less than 1 year.
- . Is not well trained...73% did not go to BEQ Managers' School.
- . (In our judgement) is not overworked...65% manage 1 building, 84% manage 3 or less, and 50% manage 156 berths, or less (156 berths is 13 modules in a Welton Beckett BEQ).
- . Is not well supported...at 43% of bases, the C.O. inspects BEQs only twice per year and only 30% of C.O.s keep property damage reports.
- . Feels that vandalism is insufficiently emphasized: 85% of BEQ Managers say that 10% (or less) of vandals are ever positively identified.
- . Is often reluctant to report individuals because of a) harassment, and b) little supportive or informational feedback on results of their initiative.
- . Is untrained or an inappropriate rating for the job. These Managers have difficulty in establishing rapport/authority with the men, a situation often linked to higher rates of vandalism.

2. The job of BEQ Managers is often given to people who are command rejects or personnel in excess...or conversely the BEQ Manager is often overloaded. Many BEQ Managers described the large number or responsibilities they hold simultaneously, like BEQ Manager, Base MAA, Base Housing Officer and Career Counselor.

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ADMINISTRATIVE GUIDELINES -- Cont.

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3. BEQ Manager is often a temporary assignment, a condition in which no relationship with the tenants can be established and little pride in the work is generated.

Recommendations:

1. All BEQ Managers attend Training School.
2. BEQ Managers be permanent staff and permanently assigned to that job.
3. A staff serving BEQ Managers be developed wherever 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 the habitability and security of the BEQs.
5. That BEQ Managers be rewarded for running a tight BEQ and maintaining records and being up-to-date on all issues affecting the BEQ.

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ADMINISTRATIVE GUIDELINES -- Cont.

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C. Problems with Security Patrols and Inspection

Forty percent of the C.O.s felt that increased security would help reduce vandalism. The project's own data analyses showed no correlation between levels of surveillance and rates of vandalism. Given the large number of C.O.s who felt strongly on this issue, we would defer to their experience in this instance.

Critical issues follow:

1. Many BEQs have several entry points, some of which do not pass the desk. Further, fire doors are used as entry points by many sailors, bypassing any control.
2. Use of ID cards at entry and guest registration procedures are seen as important in control of legitimate access to the BEQs. *(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. At present, 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, with the results that the responsible party for property damage is often not determined.



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ADMINISTRATIVE GUIDELINES -- Cont.

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Recommendations:

1. Secure as many entry points as possible, especially fire doors. These 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.
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 present on security patrols. Permanent personnel 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.

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ADMINISTRATIVE GUIDELINES -- Cont.

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D. Problems with Communication and Orientation

1. In many bases, BEQ Advisory Committees are poorly run and essentially useless. Many bases with strong BEQ Advisory Committees or Tenant Councils report them as having real utility in reducing vandalism through establishment of an effective voice for enlisted men in all aspects of BEQ management.
2. While extensive construction, modernization and other efforts to upgrade habitability and to maintain a quality environment are under way, many enlisted men are unaware of these efforts if they don't see them directly. This is especially true on large bases or ones with many tenant commands. Efforts at communicating these efforts, and to let the men know that the base is "trying" are inadequate.
3. Orientation of newly arrived personnel is often inadequate, especially regarding their rights and responsibilities involving the physical environment.

Recommendations:

1. Establish BEQ Councils with strong Command support and reward but with minimum 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. Establish as direct a line from these Councils to the C.O. as is possible. Councils might have a monthly news-letter to describe actions taken and pending.
2. Base newspapers should describe the efforts made towards increased habitability (both recent accomplishments and current plans) and simultaneously document incidents of vandalism which decrease habitability.

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ADMINISTRATIVE GUIDELINES -- Cont.

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3. Attempt some standardization of BEQ regulations (smoking in rooms, restitution procedures, redecorating of rooms, etc.) so that personnel moving from base to base have general expectations 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.