

CHANGE }  
NO. 2 }

DEPARTMENTS OF THE ARMY  
AND THE NAVY  
Washington, DC, 8 October 1982

**MILITARY CUSTODIAL SERVICES MANUAL**

This change prescribes DA Form 0000 and DA Form 0001 for the Department of the Army use. Office, Assistant Secretary of Defense has cancelled DD Form 1112 and DD Form 1113. Table 1 is revised to eliminate work standards which are listed in TB 420-10.

- 1. TM 5-609, 25 September 1969, is changed as follows:
- 2. Changed material is indicated by a star.
- 3. Remove old pages and insert revised pages as indicated below:

| Remove pages                 | Insert pages       |
|------------------------------|--------------------|
| v and vi . . . . .           | v and vi           |
| 3 through 6 . . . . .        | 3 through 6        |
| 55 and 56 . . . . .          | 55 and 56          |
| Figure 2 (fold-in) . . . . . | Figure 2 (fold-in) |

- 4. This transmittal sheet should be filed in front of the publication for reference purposes.

**The proponent agency of this manual is the Office of the Chief of Engineers. Army users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to HQDA (DAEN-MPO-B), WASH DC 20314.**

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CHANGE }  
No. 1 }

DEPARTMENTS OF THE ARMY  
AND THE NAVY  
WASHINGTON, DC, 17 October 1977

**MILITARY CUSTODIAL SERVICES MANUAL**

This change contains instructional and custodial maintenance requirements of carpets used in service facilities, other than medical and industrial facilities.

- 1. TM 5-609, 25 September 1969 is changed as follows:
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| .....          | 90.1 through 90.12 |

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AIR FORCE MANUAL  
NO. 91-2

DEPARTMENT OF THE ARMY  
  
DEPARTMENT OF THE NAVY  
  
DEPARTMENT OF THE AIR FORCE

## FOREWORD

**1. Purpose and Scope.** This manual provides commanders at Department of Defense installations with methods of accomplishing custodial services, establishes cleaning standards, and states passenger elevator operation procedures. It applies to all Department of Defense installations which have building maintaining responsibility. It implements DOD Instruction 4165.11, 24 January 1967.

**2. Content.** This manual contains instructions for determining custodial workload, technical information on cleaning agents and equipment, and practical methods for custodial services in Department of Defense installations. Special emphasis is placed on the care of floors as considerable damage has resulted to floors in the past due to careless and improper custodial practices. It is also intended to serve as a text for training custodial and elevator operator personnel. Chapter 6 contains step-by-step outlines for common phases of custodial work that may be found particularly helpful for on-the-job use.

**3. Recommendations and Suggestions.** Recommendations or suggestions for improving this manual are invited and should be submitted through the appropriate channels.

- \**a.* Department of the Army — Office of the Chief of Engineers DAEN-FEB
- b.* Department of the Navy — Naval Facilities Engineering Command (1013) or from its geographic Engineering Field Divisions
- c.* Department of the Air Force — Directorate of Civil Engineering AFOCEMC

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Supersedes AFM 85-10 and TM 5-609, 1 October 1957, and NAVFAC MO-125, Interim Edition May 1967.

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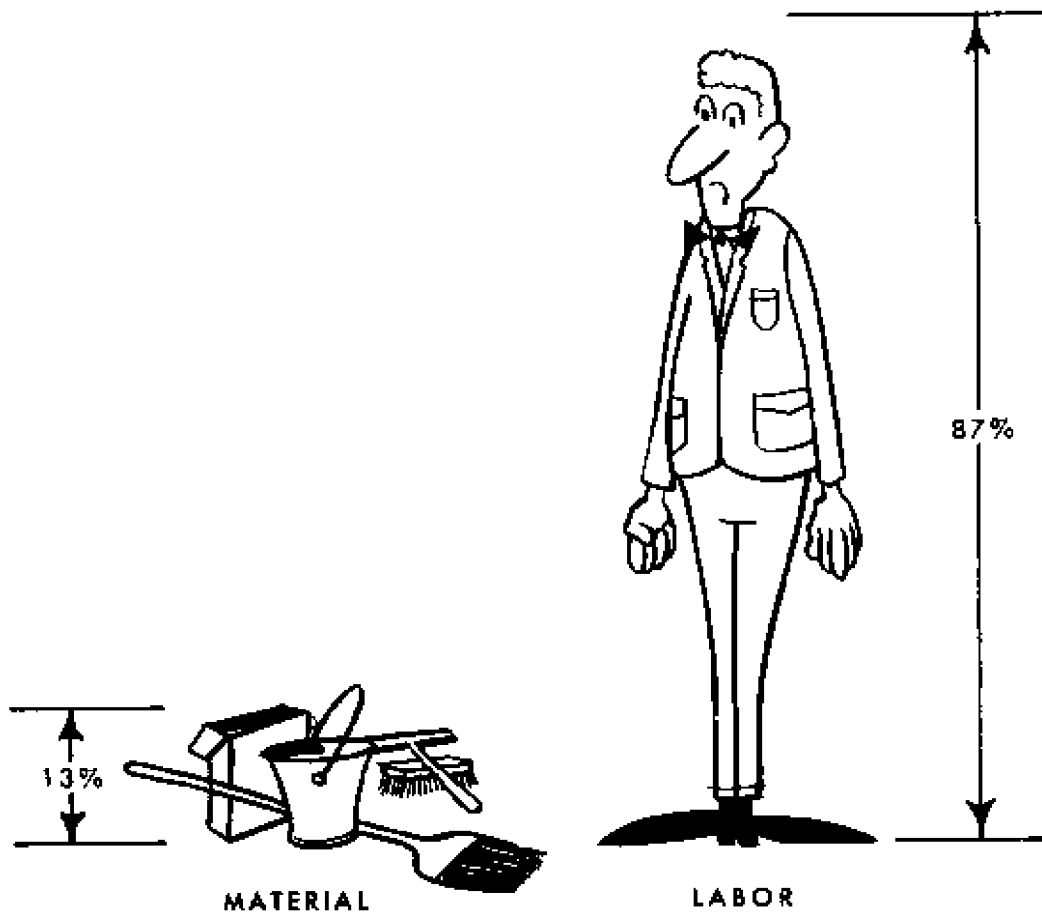
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# THINK - PLAN AHEAD



REMEMBER ! APPROXIMATELY 87% OF YOUR CUSTODIAL BUDGET IS EXPENDED FOR LABOR. THEREFORE IMPROVEMENTS & COST CUTTING MUST BE ESTABLISHED BY EFFICIENT EXPANDED FREQUENCIES AND CLEANING METHODS.



## Chapter 1 INTRODUCTION

### Section 1 - DETERMINING WORKLOAD

**1.1.1 Emphasis.** Proper housekeeping and clean surroundings are of interest to all personnel on the installation and influence both their health and morale. The cost of cleaning by in-house or contractual employees, as reflected in the budget, is considerable. However, the reported cost of cleaning applies to only a small percentage of the occupied areas. The greater cost is incurred by building occupants and users who clean their assigned areas; consequently, substantial savings can be effected by carefully analyzing requirements and assuring that the best labor-saving devices are provided and that the most efficient methods and techniques are understood and practiced throughout the installation. Frequencies of service, type of facilities, amount of traffic, type of use, and other specialized requirements will govern the area or

number of square feet that can be accomplished by a custodial worker and will directly affect the cost involved. When a contract is used for janitorial services, an economic study should be conducted to determine the most advantageous method to the Government. Custodial service type contracts will be in accordance with Armed Services Procurement Regulation and pertinent Public Laws.

**1.1.2 Use.** This manual provides information generally applicable to military installations. It is designed for use by all personnel, civil service, contractual, and/or organizational, who participate in cleaning Department of Defense buildings. In practice, improvements in techniques and equipment frequently are developed. Application of such proven developments is encouraged.

### Section 2 — ARMY RESPONSIBILITY

\* **1.2.1 Directives.** Responsibilities within the Army for various aspects of custodial services are defined in AR 420-81, AR 420-10, AR 420-17, Armed Services Procurement Regulation (APR.), and other pertinent directives (see appendix b, references).

\* **1.2.2 Commanding Officers.** The commanding officer at each level of command is responsible for the efficient administration of services and procedures prescribed therefor within the Department of the Army, including those designed to provide custodial services in the most practical and economical manner. Execution of the custodial activities may be by contract services, civilian or military personnel, or combinations of these services within the

criteria established in AR 420-81.

\* **1.2.3 Engineer:**

\*(1) The facilities engineer will administer the accomplishment of custodial services as an essential part of the building operations and maintenance function.

\*(2) The facilities engineer will implement an adequate training program for engineer personnel assigned to custodial services, and cooperation in the training of other personnel performing custodial services as outlined in the AR 420-81.

\***1.2.4 Supply Procedures.** Items of supply will be requisitioned in accordance with the procedures outlined in AR 420-17.

### Section 3 - NAVY RESPONSIBILITY

**1.3.1 Directives.** Responsibilities for custodial services within the Department of the Navy are defined or covered in DOD Instruction 4165.2 1964; NAVFAC Instructions 11014.35C, 11014.29B, 1104.22C; NAVDOCKSP-68, Contract Administration; NAVDOCKS, P-706.0, and OPNAV P11010.20 (see appendix b, references).

**1.3.2 Commander/Commanding Officer.** The Commander/Commanding Officer of each Naval Facilities Engineering Field Division is responsible for providing guidance and assistance to field activities under his cognizance for adequate custodial services programs. Custodial services must be provided in the most efficient and economical matter; whether by con-

tract, in-house, or a combination of civilian and military manpower.

**1.3.3 Public Works Officer (PWO).** Normally, the responsibilities for the programs are delegated to the PWO of an activity or a Public Works Center (PWC). The PWO or PWC administers the accomplishment of custodial services as an essential part of the maintenance function.

**1.3.3.1 Program Implementation and Training.** The PWO or PWC implements all NAVFAC Instructions, noted in 1.3.1, and establishes an adequate training program for custodial personnel. An annual short seminar is provided through the Naval Facilities Engineering Command for engineering and management personnel; i.e., planners and estimators, administrators, and specification writers. His office prepares contract specifications and awards a contract or prepares a plan for in-house forces to accomplish custodial services. His staff provides technical guidance and assistance in methods, practices, new materials, and equipment.

**1.4.1 Major Command Level.** Each major command will:

- (1) Insure that effective custodial services

are established and accomplished at all installations under its jurisdiction.

- (2) Provide for training of personnel engaged in custodial service.

- (3) When on staff visits to bases, determine technical adequacy of custodial services, cost reports and proposed custodial service contracts.

**1.4.2 Base Civil Engineer.** The base civil engineer will plan, initiate and supervise the execution of the engineer responsibilities of custodial service activities. He will:

- (1) Insure that base civil engineer custodial, service personnel are adequately trained as prescribed in chapter 6 of this manual.

- (2) Prepare specifications for custodial service type contracts, and assist in administering these contracts.

- (3) Provide technical guidance in methods and use of materials and equipment and training of other than engineer personnel performing custodial services.

**1.4.3 Medical Treatment Facilities:** The Base Medical Commander is responsible for all custodial services in the medical treatment facilities.

## Chapter 2 PLANNING AND SCHEDULING

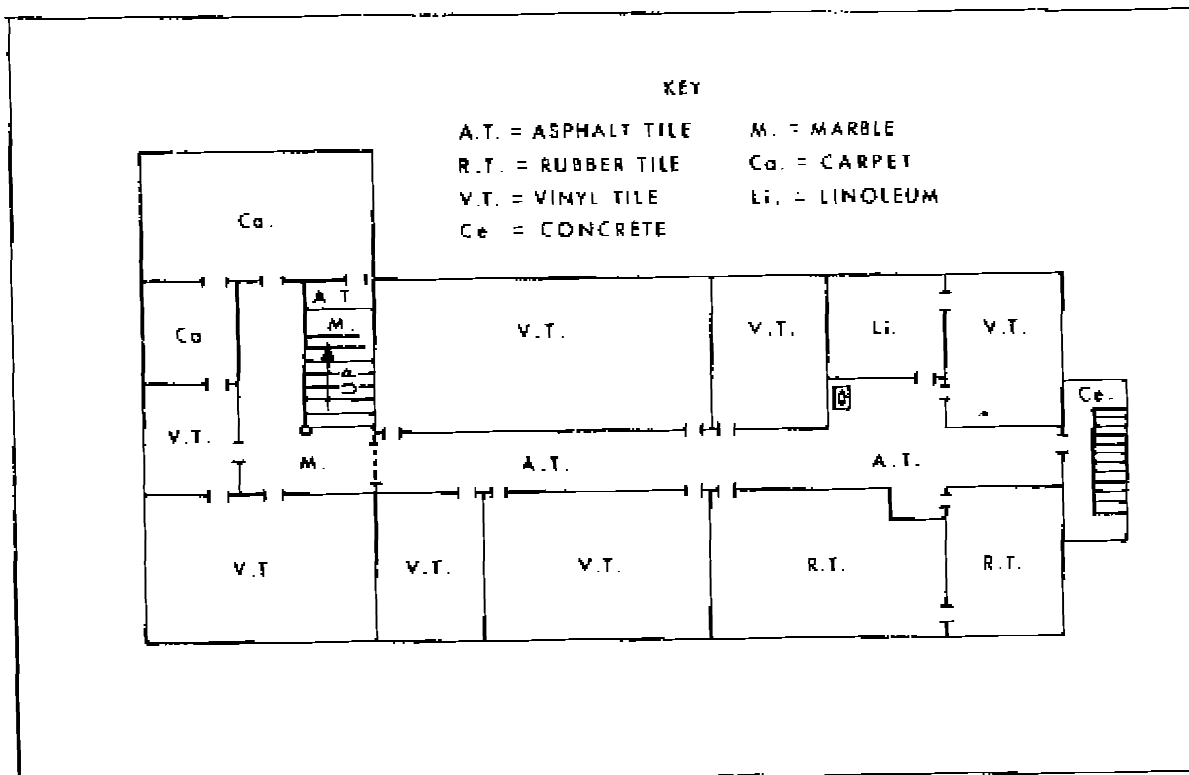
### Section 1 — DETERMINING WORKLOAD

\* **2.1.1 General.** A careful planning and analysis of custodial services is essential in the distribution of workers to provide efficient and adequate services. DA Form 5104 (Analysis of Custodial Personnel Requirements) (fig. 2) will be used by the Army for this purpose. DA Form 5104 is available through normal AG publications supply channels.

**2.1.2 Planned Operation.** Typical planning must begin with a survey to obtain complete data on all components of a building and the amount and type of traffic using each area. *Example,* a diagram (fig. 1) showing the different types of floor covering may be devised. Since each type of flooring will require different care, the chart and its accompanying information may also be used for the procurement of materials.

### 2.1.3 Reasons for Analysis.

- a. Determining workload.
- b. Determining proper distribution of workers for existing workloads and workload changes.
- c. To assure accomplishment of most essential services in all facilities for which custodial personnel are responsible when personnel authorizations are limited.
- d. Check on effectiveness of training program to determine whether each worker is carrying his share of the workload according to the standard manhour requirements resulting from the analysis.



**Figure 1. Planning Work by Floor Types.**

\* 2.1.4 **Use of DA Form 5104.** This form should be filled out for reasons indicated in paragraph 2.1.1.

Figure 2 indicates a completed analysis. The steps necessary in completing the analysis form are as follows:

- a. List building numbers and names (such as Headquarters). Use as many lines as necessary for each building.
- b. Indicate space in the building to be serviced using a line for each floor. Use separate lines for corridors, rest rooms, and areas with different floor coverings. Areas with similar work requirements can be combined.
- c. Indicate the kind of floor surface as appropriate for each area. Show area in square feet for each space listed.

\*Table I - Frequency Guide For Custodial Services

*\*Explanation:*

Frequencies of cleaning indicated are average and should be adjusted if necessary to meet the requirements of each building area. For the Army Table I will be used in conjunction with DA Form 5104.

*Categories of Buildings* Buildings are grouped in three general area categories each requiring approximately the same frequency of cleaning. These are indicated in the frequency column as (1) Administration and personnel such as offices, laboratories, cafeterias and hospitals. (2) Production—such as shops and garages. (3) Storage such as warehouses, portions of inactive buildings are in this category.

*Codes:* The various codes indicated in the frequency columns are below:  
 D—Daily M2—Every two months  
 2W—twice Weekly M3—Every three months  
 W—Weekly M4—Every four months  
 M—Monthly M6—Every six months  
 2M—Twice Monthly Y—Yearly  
 TS -indicates a local time study is required because of the many possible variations in these items.

| <i>Item and cleaning operations</i>               | <i>Frequency areas</i> |            |            |
|---|------------------------|------------|------------|
|   | <i>(1)</i>             | <i>(2)</i> | <i>(3)</i> |
| <i>Floors—Finished (1,000 sq ft) Unobstructed</i> |                        |            |            |
| Sweep   | D                      | D          | 2M         |
| Dust mop  | D                      | D          |            |
| Vacuum  | W                      | W          |            |
| Damp mop  | W                      | W          | 2M         |
| Buff  | M                      |            |            |
| Strip and re wax                                  | M6                     |            |            |
| Machine scrub and pick up                         | M6                     |            |            |
| Vacuum and buff                                   | W                      |            |            |
| Vacuum, wax touch-up, and buff                    | W                      |            |            |
| <i>Floors (1,000 sq ft) Slightly Obstructed</i>   |                        |            |            |
| Sweep   | D                      | D          | 2M         |
| Dust mop  | D                      | D          |            |
| Vacuum  | W                      | W          |            |
| Damp mop  | W                      | W          | 2M         |
| Buff  | M                      |            |            |
| Strip and re wax                                  | M6                     |            |            |
| Machine Scrub and pick up                         | M6                     |            |            |
| Vacuum and buff                                   | W                      |            |            |
| Vacuum, wax touch-up, and buff                    | M                      |            |            |

Table 1 — Frequency Guide For Custodial Services — Continued

| Item and cleaning operations                   | Frequency areas        |     |     |
|--|------------------------|-----|-----|
|  | (1)                    | (2) | (3) |
| <i>Floors—(1,000 sq ft) obstructed</i>         |                        |     |     |
| Sweep  | D                      | D   | 2M  |
| Dust mop                                       | D                      | D   |     |
| Vacuum   | W                      | W   |     |
| Damp mop                                       | W                      | W   | 2M  |
| Buff   | M                      |     |     |
| Strip and re wax                               | M6                     |     |     |
| <i>Floors (1,000 sq ft) Heavily Obstructed</i> |                        |     |     |
| Sweep  | D                      | D   | 2M  |
| Dust mop                                       | D                      | D   |     |
| Vacuum   | W                      | W   |     |
| Damp mop                                       | W                      | W   | 2M  |
| Buff   | M                      |     |     |
| Strip and re wax                               | M6                     |     |     |
| <i>Cleaning Toilet and Fixtures</i>            |                        |     |     |
| Water closets, each                            | D                      | D   | D   |
| Urinals, each                                  | D                      | D   | D   |
| Wash basins, sinks, each                       | D                      | D   | D   |
| Walls, partitions, woodwork                    | M                      | M   | M   |
| Floors   | (See Floors, Finished) |     |     |
| Dispensers, fill and clean each                | D                      | D   | D   |
| Drinking fountains, each                       | D                      | D   | D   |
| Shower walls                                   | D                      | D   | D   |
| <i>Glass Cleaning</i>                          |                        |     |     |
| Windows, each                                  | M6                     | M6  | M6  |
| Mirror, damp wash; dry:                        |                        |     |     |
| 49" x 25" each                                 | W                      | W   | W   |
| 88" x 31" each                                 | W                      | W   | W   |
| <i>Dusting, averages:</i>                      |                        |     |     |
| Desks, each                                    | D                      | D   | D   |
| Chairs, office, each                           | D                      | D   | D   |
| Bookcases, per section                         | 2W                     | 2W  | 2W  |
| Files, four drawer, single, each               | 2W                     | 2W  | 2W  |
| Venetian blinds, shades, each                  | M2                     | M2  | M2  |
| Light fixtures                                 |                        |     |     |
| Incandescent, each                             | M3                     | M3  | M3  |
| Fluorescent, each                              | M6                     | M6  | M6  |
| Walls, ceilings, pipes, screens                | M6                     | M6  | Y   |
| <i>Washing, averages:</i>                      |                        |     |     |
| Wall, partitions (100 sq. ft.) (with ladder)   | Y                      | Y   |     |
| Ceilings (100 sq. ft.) with scaffold)          | Y                      | Y   |     |
| Baseboards, sills (100 lin. ft.)               | Y                      | Y   |     |
| Glass partitions (100 sq. ft.) (with ladder)   | Y                      | Y   |     |
| Tile (100 sq. ft.) (without ladder)            | M6                     | M6  |     |
| Wash door (2 sides and frames)                 | Y                      | Y   |     |
| <i>Miscellaneous cleaning, averages:</i>       |                        |     |     |
| Venetian blinds, wash-rinse, each              | Y                      | Y   | Y   |
| Light fixtures, damp wipe:                     |                        |     |     |
| Incandescent, each                             | Y                      | Y   |     |
| Incandescent inclosed, each                    | Y                      | Y   |     |
| Fluorescent, each                              | Y                      | Y   |     |
| Radiators, with heaters                        | M6                     | M   | M6  |
| Air Conditioning grills                        | M6                     | M6  |     |
| Vacuuming carpets, 1000 sq. ft.                | W                      | W   |     |
| Walls, partitions, woodwork:                   |                        |     |     |
| Hand, wash-rinse, average, 1000 sq. ft.        | Y                      | Y   |     |
| Spot clean                                     | D                      |     |     |

Table 1 — Frequency Guide For Custodial Services — Continued

| Item and cleaning operations       | Frequency areas |     |     |
|------------------------------------|-----------------|-----|-----|
|                                    | (1)             | (2) | (3) |
| Furniture, clean, wax, polish      | M6              | M6  | M6  |
| Stairways, sweep or mop            | 3W              | 3W  |     |
| Entrances, sweep or mop            | 3W              | 3W  | 3W  |
| Sand Urns, clean, each             | D               | D   |     |
| Ashtrays, empty, clean, each       | D               | D   |     |
| Wastebaskets, empty, each          | D               | D   | D   |
| Trash removal                      | D               | D   | D   |
| Classroom Blackboards, 100 sq. ft. | D               |     |     |
| Carpet shampooing, 1000 sq. ft.    | Y               |     |     |

d. Enter the number of fixtures, square feet of walls, partitions, and floors cleaned opposite each building area listed in the appropriate columns under toilet and fixture cleaning.

e. Enter the number or area in square feet of each item cleaned in the appropriate columns under glass and miscellaneous cleaning.

\* f. Using the frequency guides in table 1, and unit times in TB 420-10, enter the frequencies and manhour requirements for each cleaning operation to be performed. Manhour requirements should be either all on a monthly basis, or all on an annual basis for each analysis.

g. Enter the total manhours for each type of cleaning operation at the bottom line of each column, and the totals for each building in the right hand column. The grand totals across the bottom line, and of the right hand column should be equal. These totals indicate productive manhours using Engineering Performance Standards.

\* h. Enter total productive manhours under Manhour and Personnel Requirements at top of form in item No. 1. Figure 2 is a sample analysis of DA Form 5104 and is an example only. Items 2 and 3 will be filled out according to TB 420-2 and TB 420-10.

will be used to determine manpower requirements for individual jobs and for total adjustments in consideration of non-productive time. Use DA Form 5104 to complete total manpower requirements. Since 87 percent of the custodial budget is expended for labor, any reduction in custodial services can only be established by reduction of frequency cycles or improvement in production rates. Proper scheduling should result in increased coverage and achieve noticeable savings in labor costs. Remember that each floor covering, hard and soft, is different and custodians must know floor limitations to apply the correct cleaning procedures. Under a properly established custodial services program, each man will be able to see the results of his own work.

**2.1.6 Flexible Two-Part System.** Workload, staffing, evaluation, and accomplishment, based on actual requirements, presents an ideal flexible method for a custodial program. This method indicates what can be done

**2.1.5 Preparation and Scheduling.** \*The next important step is to prepare floor or crew schedules. The schedule should show areas to be cleaned, waxed, and polished each day of the month. Such schedules must be flexible, of course, to meet changing needs and special requests. Applicable "Service Work Performance Standards" for custodial services

Located in Back of Manual

locally when an on-site and thorough review of the facts is made. Reasonable frequencies and levels of services are put into effect, area by area, and floor by floor, and then evaluated. The salient feature of the system developed is a two-part plan of personnel utilization for: (1) mandatory or daily routine services, and (2) variable or flexible services that can be changed in frequency. *For example*, while waxing might be a monthly assignment in a given area, a day or even a week slippage will not hurt. By using this system, one group of employees has continual assigned duties and the second group has variable duties. Thus when unexpected absences occur a second group employee can step into the first group and carry on the firm routine schedules. In fact,

the second group functions as an augmentation or cushion group of employees. This system is efficient and should be considered.

## Section 2 — SUPPLIES AND EQUIPMENT

**2.2.1 General.** Custodial supplies consist of materials used in performing custodial services, except tools and equipment. Purpose of this section is to describe these supplies, their function, and usage. Supplies and equipment most commonly used are listed in table 2. Principal cleaning and stain removal agents are described in the following paragraphs of this section. Their use and the use and care of equipment are discussed in chapter 2 and chapter 3 of this manual.

Table 2—Supplies and Equipment Commonly Used

| Item  | Specification   | Federal Stock No. |
|---|-----------------|-------------------|
| Acid, Muriatic 1 lb   | O-A-86          | 6810-222-9660     |
| Alcohol, Denatured  | O-E-760 (TR-1R) | 6810-205-0786     |
| Ammonia, Diluted Solution, Household qt Bottle                              | O-A-451         | 681-527-2476      |
| Belt, Safety  | KK-R-151        | 4240-752-0716     |
| Broom, Upright, 32 lb per doz   | H-B-51          | 7920-292-4372     |
| Broom, Push, 18"  | H-B-271         | 7920-246-8500     |
| Broom, Push, 24"  | H-B-271         | 7920-246-8499     |
| Brush, Floor Sweeping 18", 100% Horsehair                                   | H-B-651         | 7920-243-3407     |
| Brush, Floor Sweeping 24", 100% Horsehair                                   | H-B-651         | 7920-238-2442     |
| Brush, Floor Sweeping 30", 100% Horsehair                                   | H-B-651         | 7920-292-2363     |
| Brush, Floor, Sweeping Sidewalk 24"   | H-B-00646       | 7920-292-2360     |
| Brush, Scrub, Hand 8"   | H-R-00541       | 7920-240-7174     |
| Brush, Scrub, 10" for Handle  | H-B-531         | 7920-240-7171     |
| Brush, Dusting, Bench   | H-B-190         | 7920-178-8315     |
| Brush, Dusting, Radiator, Horsehair   | H-B-190         | 7920-232-3737     |
| Brush, Dusting, Radiator, Tampico Fiber                                     | H-B-190         | 7920-286-6811     |
| Brush, Sanitary (Horsehair)   | H-B-481         | 7920-141-5450     |
| Brush, Sanitary (Tampico Fiber)   | H-B-481         | 7920-240-7178     |
| Cabinet, Storage, Steel   | AA-C-31         | 7125-641-5436     |
| Cleaning Compound, Toilet Bowl  | P-C-447         | 7930-550-9431     |
| Cleaner, Vacuum, Household, Tank Type                                       | WC-421          | 7910-254-4966     |
| Cleaner, Vacuum, Industrial   | W-C-421         | 7910-132-5352     |
| Cleaning Compound syn detergent, non abrasive                               | P-D-220         | 7930-634-1962     |
| Cloth, Polishing (Oil Treated)  | DDD-C-411       | 7920-205-3170     |
| Cloth, Polishing (Untreated)  | DDD-C-411       | 7920-654-0103     |
| Chamois, Leather, Sheepskin, 16" x 21"                                      | KK-C-300        | 8330-257-2494     |
| Compound, Sweeping  | P-S-00863       | 7930-633-9850     |
| Detergent, Sanitizer, concentrate   | P-D-00235       | 7930-985-8896     |
| Detergent, Sanitizer, super concentrate                                     | P-D-001038      | 7930-973-2196     |
| Detergent, Painted Surface, All Purpose, Liquid<br>(Also for Floor Cleaner) |                 |                   |
| 5 gal, 10% Active   | P-D-220         | 7930-634-3441     |
| 55 gal, 10% Active  | P-D-220         | 7930-634-3442     |
| 5 gal, 20% Active   | P-D-220         | 7930-527-1207     |
| 55 gal, 20% Active  | P-D-220         | 7930-527-1273     |



Table 2—Supplies and Equipment Commonly Used—Continued

| Item  | Specification | Federal Stock No. |
|---|---------------|-------------------|
| Finish, Resin Emulsion  | POD-BM-22     | 7980-732-3875     |
| Glycerin, USP 1 lb Bottle   |               | 8505-153-8220     |
| Glycol, Polyethylene  |               | 8510-245-0259     |
| Gloves, Gauntlet, Work  |               | 8415-634-4557     |
| Gloves, Rubber  | GSA-223       | 8415-634-4585     |
|   |               | to 8415-634-4643  |
|   |               | 8415-634-5021     |
| Gloves, Short, Work   |               | 7920-263-0328     |
| Handle, Wood, Acme, Threaded End 72" Brush Broom                              | NN-H-104      | 7920-205-1170     |
| Handle, Wet Mop, 60", Screw Type  | NN-H-101      | 7920-243-7100     |
| Handle, Dust Mop, 72"   | NN-H-104      | 5120-221-1536     |
| Knife, Putty, 1½"   | GGG-K-481     | 5440-531-8116     |
| Ladder, Step, Wood, Safety Type, 6 ft   | LLL-S-710     | 5440-514-4487     |
| Ladder, Step Bucket Shelf, 8 ft Aluminum                                      | RR-S-00720    | 5440-081-8897     |
| Ladder, Safety, Fiber Glass, 12 ft  |               | 5540-081-8898     |
| Ladder, Safety, Fiber Glass, 8 ft   |               |                   |
| Machine, Wall Washing   | MIL-M-2400    |                   |
| Machine, Scrubbing 28" Twin Brush   | F.S. W-G-856  |                   |
| Bucket, 14 qt, Galv   | RR-P-0030     | 7240-634-0437     |
| Disinfectant, Germicidal and Fungicidal                                       | O-D-405       | 5840-530-7109     |
| Mophead, Dusting, Cotton  | T-M-587       | 7920-245-8289     |
| Mop Bucket, 26 qt   | RR-R-300      | 7920-205-0479     |
| Mop-Treating Compound, Dust, Liquid   | P-D-800       | 6350-664-6536     |
| Mop Wringer, Squeeze Type   | RR-W-670      | 7920-205-0408     |
| Mop Truck, Two-Tank, 28 gal Capacity per Tank,<br>3 in Diameter Wringer Rolls |               |                   |
| Mop, Dusting, Cotton, 17", Straight   | T-M-587       | 7920-205-1092     |
| Mop, Dusting, Cotton, 27", Straight   | T-M-567       | 7920-171-1149     |
| Mop, Cellulose, Sponge, Yarn, 24 oz   | V-B-S-12      | 7920-634-0203     |
| Mop, Cellulose, Sponge, Yarn, 12 oz   | V-B-S-12      | 7920-634-0202     |
| Mophead, Wet, Cotton, 1½ lb   | T-M-581       | 7920-141-5550     |
| Mophead, Dusting, Cotton  | GSA-407       | 7920-205-1093     |
| Mop Treatment Compound  | P-D-800b      | 6350-664-6536     |
| Pad Steel Wool Floor Polishing  | 00-P-0065     | 7910-550-5250     |
|   |               | to 5285           |
| Polish, Metal, pint   | P-P-556       | 7980-266-7187     |
| Polish, Furniture, quart  | P-P-553       | 7980-266-7121     |
| Polisher, Floor, Electric, 11", Disk Type                                     | W-M-45        | 7910-224-7985     |
| Polisher, Floor, Electric, 15", Disk Type                                     | W-M-46        | 7910-375-2428     |
|   |               | 7910-375-2429     |
|   |               | 7910-287-5580     |
|   |               | 7910-383-5538     |
|   |               | 7910-281-3680     |
|   |               | 7910-391-0507     |
|   |               | 7910-393-0108     |
|   |               | 7910-224-7986     |
| Polisher, Floor, Electric, 18", Disk Type                                     |               | 7910-364-7246     |
| Coarse 15"  | 00-P-570      | 7910-286-6812     |
| Medium 15"  |               | 7910-224-7983     |
| Fine 15"  |               | 7910-224-7982     |
| Polisher-Scrubber, Vacuum, Floor Electric                                     | 00-P-00580    | 7910-537-342      |
| Sealer, Terrazzo (5 gal Can)  |               | 8110-598-5719     |
| Sealer, Terrazzo (55 gal Drum)  |               | 8110-598-5720     |
| Scouring Powder, lb Can   | P-S-311       | 7980-205-0442     |
| Scrubbing Machine, Floor Electric, Power battery                              | 00-S-00255    | 7910-918-6487     |
|   |               | to 8490           |
| Soap, Toilet, Liquid, Gallon  | P-S-624       | 8520-228-0598     |
| Soap, Toilet, Paste, 10 lb. Can   | P-S-624       | 8520-634-2784     |

Table 2—Supplies and Equipment Commonly Used—Continued

| Item  | Specification         | Federal Stock No  |
|---|-----------------------|---|
| Soap, Toilet, Powdered Form, 5#   | P-S-825               | 8520-222-0985   |
| Sponge, Cellulose, 3-13/16" x 6" Laminated  | L-S-00626             | 7920-834-1116   |
| Sponge, Natural   | C-S-831               | 7920-237-8731   |
| Squeegee 12", Window  | ZZ-S-658              | 7920-577-4745   |
| Squeegee 18", Floor, with Handle  | ZZ-S-866              | 7920-237-2971   |
| Sodium Hydrosulfite, 1 lb   |                       | 6810-226-6021   |
| Sodium Citrate, 1/2 lb. Bottle  |                       | 6505-153-8199   |
| Steel Wool, Grade 0, 1 lb   | FF-S-740              | 5350-242-4405   |
| Steel Wool, Grade 1, 1 lb   | FF-S-740              | 5250-242-4404   |
| Steel Wool, Grade 2, 1 lb   | FF-S-740              | 5350-242-4406   |
| Steel Wool, Grade 3, 1 lb   | FF-S-740              | 5350-242-4403   |
| Towels, Paper   | UU-T-591              | 8540-262-7178   |
| Toilet Tissue   | UU-P-556              | 8640-530-3770   |
| Trisodium Phosphate, 1 lb   | O-S-00642             | 6810-220-1398   |
| Truck, 2 Wheel, Hand, General Utility Type  |                       | 3920-222-1024   |
| Truck, Platform, Hand, Non-Tilt, Type Wood, 60" Long  |                       | 3920-229-4283   |
| Wax Applicator  | II-A-00600            | 7920-633-8774   |
| Wax, Applicator Pad   | H-A-00600             | 7920-632-9274   |
| Wax, Floor, Water Emulsion (12% Solids), 5 Gal  | P-W-155               | 7930-274-8252   |
| Wax, Floor, Water Emulsion (12% Solids) 55 Gal  | P-W-155               | 7930-274-8253   |
| Wax, Floor, Water Emulsion (16% Solids) 1 Gal   | P-W-155               | 7930-205-2870   |
| Wax, Floor, Water Emulsion (16% Solids), 5 Gal  | P-W-155               | 7930-141-5833   |
| Wax, Floor, Water Emulsion (16% Solids), 55 Gal   | P-W-155               | 7930-205-2871   |
| Wax Remover and Cleaner, Regular Concentration, Add 8 Parts Water, 5 Gal  | P-R-201               | 7930-664-7053   |
| Wax Remover and Cleaner, Regular Concentration, Add 8 Parts Water, 55 Gal   | P-R-201               | 7920-664-7054   |
| Wax Remover and Cleaner, High Concentration, 5 Gal  | P-R-201               | 7930-664-7050   |
| Floor Finish, Water Emulsion, 5 gal   | P-F-00430             | 7330-664-7053   |
| Wringer & Bucket, Mop   | RR-M-1075             | 7920-527-2498   |
| Glass Cleaner, Liquid   | P-G-406               | 7930-664-6909   |
| Pad, Steel Wool, Grade D  |                       |   |
| Pad, Steel Wool, Grade 1  |                       |   |
| Pad, Steel Wool, Grade 2  |                       |   |
| Pad, Steel Wool, Grade 3  |                       |   |
| Pad, Lambswool Polishing  |                       |   |
| Pad, Synthetic, Fine, Polishing   |                       |   |
| Pad, Synthetic, Medium, Scrubbing   |                       |   |
| Pad, Synthetic, Coarse, Stripping   |                       |   |
| Pads, Floor polishing machine, nonwoven nylon web, for maint. cleaning of resilient tile, terrazzo, marble, ceramic and wooden floors | 00 P-0040<br>Class 79 | 7910-685-4243<br>7910-685-6859<br>7910-685-6671<br>7910-985-6870<br>7910-985-6861<br>7910-985-6861<br>7910-820-9917 |
| Pads, floor, curled hair, extra thick durable, washable and reversible  |                       | 7910-820-9904<br>7910-820-7984  |
| Pad, thick nylon for rotary polisher—Coarse 15"   |                       |   |
| Pad, thick nylon for rotary polisher—Medium "   |                       |   |
| Pad, thick nylon for rotary polisher—Fine "   |                       |   |
| Baseboard pad-holder for floor machine brush  |                       |   |
| Wallwasher, pressure tank system  |                       |   |
| Sponges & nylon web hand pads   |                       |   |
| Window washer, telescopic   |                       |   |

**2.2.2 Cleaning Agents.** Cleaning agents commonly used in custodial services may be divided into two general classes; those emulsifying dirt with water, and those removing it by abrasive action. Some cleaning agents combine these actions.

#### 2.2.2.1 *Emulsifying Agents:*

(1) Soaps—Consist of fats or oils combined with an alkali of sodium, or potassium. Strong soaps, such as yellow Gl, are made from an alkali of sodium and fat and have an excess of free alkali. Toilet and hand soaps are usually made with palm, coconut, or cottonseed oils and alkali of sodium or potassium and have a low free alkali content.

(2) Liquid Hand Soap—is similar to toilet soaps but is in solution with water. The soap content varies from 15 to 42 percent.

(3) Soap Substitutes:

(a) Detergents—Detergents have largely replaced soaps for the various cleaning processes in custodial services. The standard detergent for these processes is known as "All Purpose Synthetic Detergent Cleaning Compound" meeting the requirements of Federal Specification No. P-D-00223. The detergent comes in powder or flakes, liquid and paste and contains no abrasives or fatty acid soaps and is not irritating to the skin. It is excellent for cleaning painted surfaces, asphalt and rubber tile, and sheet floor coverings.

(b) Trisodium Phosphate—is an inexpensive, strong cleaning agent. It is especially effective for removing grease and oil. It should not be used for cleaning painted surfaces, except for heavily soiled areas that cannot be cleaned with detergents, and then in only weak solutions. Trisodium phosphate should not be used on wood, linoleum, asphalt or rubber tile, or oxychloride floors.

2.2.2.2. *Scouring Powder.* Scouring powder is a combination of soap powder and abrasives, such as powdered quartz, feldspar, marble, lava, or pumice. In order to prevent serious scratching of surfaces, these abrasives should pass through a number 100 sieve. Trisodium phosphate may be added to improve the cleaning properties of the powder. Abrasives and trisodium phosphate

should not be used on marble, terrazzo, asphalt tile, rubber tile, linoleum, wood floors, painted surfaces, or as metal polish, and should be used with care on ceramic and quarry tile.

*IMPORTANT:* If cleaning is done regularly and properly, there should be little need for use of scouring powder.

2.2.2.3 *Precautions in Use of Cleaning Agents.* Cleaning agents attack surfaces as well as dirt or grime. When cleaning agents are used, there is some damage to surfaces. In order to clean and do as little damage as possible, these rules should be followed:

(1) Never use washing solution stronger than necessary. Directions for preparing washing solutions are given in this manual.

(2) Apply washing solution only long enough to loosen dirt.

(3) Rinse cleaned surfaces with clear water.

(4) Do not spill washing solution on surfaces not to be cleaned. Particular care should be taken not to splash cleaning agents against calcimined or casein-painted walls, because it is impossible to wipe without spotting wall. In other cases, spilled solution should be wiped up immediately with clean cloth.

(5) Use steel wool, scouring powders, and abrasives only when absolutely necessary. When used, care should be taken to prevent damage to surface cleaned.

#### 2.2.2.4 *Stain Removers:*

(1) Stain removers can clean in three ways; by dissolving substance causing stain, by acting as bleaching agent, or by absorbing substance causing stain. Most stains can be removed by methods recommended in Table 3.

(2) In some instances, water causes stains on washbowls, urinals, and toilet bowls. Daily cleaning with all-purpose synthetic detergent solution will remove these stains. If fixtures are badly stained, use soap-grit cake and damp cloth. If this fails, mix a weak solution of sodium bisulfate (toilet bowl cleaner) and apply with cloth attached to a stick. Leave solution on stain long enough to remove it. Wash with all-purpose

synthetic detergent solution thoroughly. Repeated use of toilet bowl cleaner will remove glaze from porcelain and porcelain enameled fixtures, making them impossible to clean satisfactorily. Do not use muriatic, oxalic, or hypochlorous acid to remove stains on porcelain. They destroy surface glaze very quickly.

**2.2.2.5 Abrasive Cleaners.** Abrasive cleaners contain sharp grit particles which vary in size and hardness. Soap-grit cake and scouring powders also contain these abrasives. Particles should be fine enough to pass through a number 100 sieve. Soap-grit cake should not be used to polish metal. If plumbing fixtures are properly cleaned daily, there should be little need for use of abrasives.

### **2.2.3 Polishing Agents:**

**2.2.3.1 Metal Polish.** Metal polish is made from fine abrasive and cleaner such as soap or soap powder. Abrasive removes tarnished surface of metal, soap helps carry it away. See paragraphs 8.5.1.10 and 3.5.1.12 for directions for polishing brass, copper, nickel, and chromium fixtures.

**2.2.3.2 Furniture Polish.** Furniture polish should remove dirt, leave a gloss or sheen, and protect surfaces. It is applied manually with a dampened cloth pad. Some polishes consist only of light oil which provides gloss as long as surfaces are wet. Others contain waxes mixed with oil which brighten and protect surfaces after oil evaporates. Polish should not leave surfaces oily or sticky, should not injure varnish or enamel, and dust should not stick to it. Good polish may be made by dissolving ½ pound of carnauba wax in one gallon of turpentine at room temperature.

**2.2.4 Waxes and Finishes.** Waxes may be made of animal, vegetable, mineral, or synthetic origin. Best known vegetable wax is carnauba. It is the hardest and most durable of waxes. Usually, all good wax products contain some carnauba. Waxes are waterproof, and may be dissolved in alcohol, turpentine, or mineral spirits. Good floor

wax has a high melting point, is hard, and takes high polish. Table 6 shows wax recommended for use on various floor surfaces.

**2.2.4.1. Mineral Spirit and Paste Wax.** These waxes, because of the fire hazard involved, are to be used only on approval by the engineer of the installation.

#### **2.2.4.2 Water Emulsion Wax:**

(1) **General.** Water emulsion wax consists of carnauba wax, resin, and emulsifying materials in 12 percent and 16 percent concentrations. Drops of wax are held in suspension. Ammonia is sometimes added to make emulsion more water-proof after drying. After application, water evaporates, leaving wax in tiny drops which have a sheen or gloss. For this reason, water emulsion wax does not need buffing to look well. However, buffing makes wax stick better, wear better and makes it more waterproof. Specification P-W-155 governs the specifications for water emulsion wax.

(2) **Precautions in Handling Water Emulsion Wax.** Water emulsion wax is a delicate solution. Adding water, freezing, or using a dirty mop or container breaks down its properties. It is important, therefore, to prevent wax from freezing, and to use clean mops and containers. Water emulsion wax should be stored in other than galvanized containers to prevent the development of an acid which eventually causes spoilage. Unused wax shall not be poured back into its regular container, but be disposed of by an approved means.

**2.2.4.3 Bar Wax. General.** Bar wax is a mixture of pure carnauba wax and nonslip resins. It is cast in bars and contains no solvents.

**2.2.4.4 Resin Emulsion Floor Finishes.** This type floor finish contains no wax and is usually composed, in whole or in part, of acrylic, polyethylene, and polyvinyl resins in emulsion with water. The finishes have not been developed sufficiently to replace water emulsion wax for general use. However, the finishes usually require no buffing and are

Table 4—Stain Removal Data

| Stain                     | Carpets  | On wood  | On linoleum  | On asphalt tile             | On vinyl   | On marble, terrazzo or oxychloride cement   | On concrete  |
|---------------------------|--|--|--|-----------------------------|--|---|--|
| Blood                     | Allow household ammonia to stay on only a moment. Rinse using a cloth and cold water. Brush nap. Apply kerosene to the spot using circular motion working from edge to center to avoid a ring. Sharpen, dry and brush nap. | Rub with cloth dampened in clear cold water. When stain persists, dampen cloth with ammonia. Pour kerosene on spot. Permit to soak for a short time. Wipe dry with a clean cloth. Wash with all-purpose synthetic detergent solution, rinse and dry. | Same as for wood.  | Same as for wood.           | Same as for wood.  | Rub with cloth dampened in clear cold water. Bleach with peroxide, when stain persists.   | Same as for marble.  |
| Grease or oil             |  |  | Scrub with warm all-purpose synthetic detergent solution. Rinse with clear water.  | Same as for linoleum.       | Same as for wood.  | Pour solvent on spot, cover with Fuller's earth and let stand for several hours. Repeat, if necessary. Scrub with mild soapy water and rinse thoroughly with clear water. | Pour alcohol on spot. Rub with clean cloth, or spray the stain with a commercial degreaser product, and flush with clear water according to manufacturer's instructions. |
| Ink                       | Remove immediately. Same as for vinyl.   | Apply solution 1 part oxalic acid crystals to 9 parts warm water. Permit to stand until dry. Mop with clear water.   | Use warm all-purpose synthetic detergent solution. If stain persists, mix 2 lbs sodium perborate in pint of hot water. Mix whitening to form paste. Apply to spot and let dry. Same as for wood. | Same as for linoleum.       | Wash with all-purpose synthetic detergent, rinse, then dry. If stain persists, rub with cloth dampened with ammonia. | Same as for linoleum.   | Same as for linoleum.  |
| Iodine or mercuric chroma | Blot immediately. Wash with all-purpose synthetic detergent, rinse, then dry.  | Apply alcohol and rub with clean cloth.  |  | Warm neutral soap solution. | Wash with all-purpose synthetic detergent, rinse, then dry. If stain persists, scrub with—                           | Apply alcohol and cover with Fuller's earth.  | Apply alcohol and rub with clean cloth.  |

|       |  |   |  |  |   |   |   |
|-------|--|---|--|--|---|---|---|
| Paint | Apply turpentine or mineral spirits. Wash with strong lukewarm soap-soda. Rinse with clear water, wipe with clean cloth and let dry. | Use oxalic acid solution, or 1 lb tri-sodium phosphate in 1 gal warm water.         | Rub with No. 0 steel wool dipped in turpentine. Wash with all-purpose synthetic detergent solution and rinse with clear water. | Rub with steel wool and all-purpose synthetic detergent solution. If area is large, use steel wool on buffing machine. | scrubbing powder and warm water.<br>Rub with No. 0 steel wool dipped in kerosene. | Rub with No. 00 steel wool dipped in turpentine.  | Scrub with 1 lb trisodium phosphate in 1 gal hot water, rinse with clear water.   |
| Rust  | Wash with all-purpose synthetic detergent. Rinse using a cloth and cold water. Brush nap.  | Wash with all-purpose synthetic detergent. Rub with No. 0 steel wool, if necessary. | Apply solution 1 part oxalic acid to 9 parts warm water. Let dry. Rinse thoroughly with clear water.                           | Rub with No. 0 steel wool and all-purpose synthetic detergent solution.  | Same as for linoleum.   | <i>Horizontal Surfaces</i><br>To $\frac{3}{4}$ gal water add 1.9 lb sodium citrate and 1 lb sodium hydro-sulfite. Add enough water to make a gallon solution. Cover stain with solution and let stand $\frac{1}{2}$ hr. Absorb with cloth by rubbing. Rinse with clear water. | Dissolve 1 part sodium citrate in 6 parts water. Mix with equal parts of glycerin. Make a paste with whitening and apply to stain. For bad stains, wash with sodium citrate solution 1-6 parts, add pad soaked in sodium hydro-sulfite for 10-15 min. Wash thoroughly with water. |
|       |  |   |  |  |   | <i>Vertical surfaces</i><br>Make paste with whitening and 8 oz sodium citrate and 8 oz sodium hydro-sulfite. Apply with putty knife and allow to remain 1 hr. Wash with sodium citrate.   |   |

Table 5—Stain Removal Data—Continued

| Stain               | Carpets  | On wood  | On linoleum       | On asphalt tile  | On vinyl   | On marble, terrazzo or oxychloride cement   | On concrete         |
|---------------------|--|--|-------------------|--|--|---|---------------------|
| Soil and heel marks | Shampoo lightly with all-purpose synthetic solution and rinse with clean water. Wipe off and vacuum.<br>Brush nap. | Rub with No. 0 steel wool or wash with all-purpose synthetic detergent solution.   | Same as for wood. | Same as for wood.  | Rub with No. 0 steel wool dipped in all-purpose synthetic detergent solution.  | Wash with all-purpose synthetic detergent solution and rinse.                     | Same as for marble. |
| Chewing gum         | Scrape off with dull knife.<br>Sponge off with clear water.  | Remove gum with putty knife. Apply alcohol, rub with clean cloth.  | Same as for wood. | Remove gum with putty knife. Do not use alcohol on asphalt tile.   | Remove as much as possible with putty knife. Rub with No. 0 steel wool dipped in all-purpose synthetic detergent solution. | Same as for wood.   | Same as for wood.   |
| Tar                 | Same as for grease or oil.   | Remove tar with putty knife. Soak with kerosene. Rub with clean cloth. Wash with all-purpose synthetic detergent solution. | Same as for wood. | Remove surplus with putty knife. Do not put kerosene on asphalt tile. Wash with warm all-purpose synthetic detergent solution. | Same as for wood.  | Remove surplus with putty knife. Soak with alcohol and cover with Fuller's earth. | Same as for wood.   |

slip-resistant. For these reasons they are particularly suitable for use where buffers are not available, in congested areas where the use of buffers is difficult, and where slip resistance is important, such as on ramps.

### **2.2.5 Floor Oil.**

*2.2.5.1 General.* One type of floor oil consists of linseed oil and turpentine, or mineral spirits. When applied to floor it penetrates, and dries to a fairly hard, non-oily surface. Another type, paraffin-base floor oil, penetrates wood, but does not harden. This leaves floor slippery until oil is washed off or worn away. While floor oils serve to control dust, they also present disadvantages. Oils darken wood floors, and soften fibers of many woods, thereby reducing wearing quality. When oiled floors are mopped, detergent emulsifies the oil and quickly removes the oil from the wood.

*2.2.5.2 Use of Floor Oil.* Floor oil should be used only when floors are in such condition that they cannot be sealed satisfactorily and dust control is important. Floor oils present a fire hazard, and must be used carefully. Oils must not be used where a fire hazard is inherent in the work which is done in the area.

**2.2.6 Disinfectants.** Disinfectants are designed to kill germs and may consist of phenol (carbolic acid), pine oil, cresol, creosote, iodo, or cresylic acid. They kill germs by coming in contact with them and must be applied directly. If floors are kept clean, toilet rooms at satisfactory standard of cleanliness, and waste disposed of properly, germs have small chance of breeding.

**CAUTION. DISINFECTANTS ARE POISONS.**

**2.2.7 Deodorants.** Deodorants are used to eliminate disagreeable odors. When the use

of deodorants is necessary, it is an indication the area is not properly cleaned and ventilated. Deodorants are unpleasant to many people. Odor-masking devices will not be used. They are not a substitute for thorough cleanliness of the fixtures.

**2.2.8 Sanitizer.** Chemicals used to sanitize should be approved by Natick Laboratories, Naval Civil Engineering Laboratories or the Office of The Surgeon General. Approved items are listed in the Federal Supply Catalog. The Federal Supply Catalog should be consulted first when procuring sanitizers and every attempt should be made to use the items listed. At the present time there is no universal sanitizer which is effective under all conditions. Local conditions such as water hardness or acidity will change the effectiveness of most items. Area surgeons should be consulted when the effectiveness of a sanitizer is in doubt and especially when local conditions require the use of locally procured items. The surgeon is available to assist in the evaluation of the effectiveness of sanitizers under local conditions and to make recommendations regarding the equipment, chemicals, and procedures which are appropriate.

**2.2.9 Storage of Custodial Supplies.** Custodial supplies for replenishing items are kept in a centrally located area under direct control of supervisor. Supplies are stored in ventilated, conveniently located closets or cabinets issued to workers. Cabinets should be available at all times for inspection to insure that supplies are stored safely and do not present a fire hazard. Particular caution should be exercised to insure that soiled rags, mops, etc. are stored safely; either in the open air outside of buildings or in fireproof, closed containers in well-ventilated locations. Only one day's supply of flammable cleaning materials should be kept on hand in the working area.



## Chapter 3

### CUSTODIAL SERVICE METHODS

#### Section 1— FLOOR CLEANING

**3.1.1 Introduction.** With the upgrading of present day floor coverings, the old type wood floors have in the majority of instances been replaced with resilient smooth surface flooring materials such as asphalt tile, vinyl asbestos, vinyl, rubber tile, linoleum, linotile and cork. Care of these floors is generally the key to an overall economical custodial program. With the installation of these floor coverings, the development of synthetic and concentrated cleaning materials, and with labor costs taking the greater part of the custodial budget, the proper training and motivation of the custodial worker is the key to lower cost for custodial services. It is essential that the worker be trained in the modern methods and equipped with supplies and modern tools necessary to accomplish his job. There is no one miracle finish or even perfect type finish. There are a number of variables that will affect the floor finish such as: low humidity will cause a finish to powder or to become slippery, yellowing tendencies of some finishes may be objectionable on light floors yet give excellent results on others.

**3.1.2 Floor Cleaning.** Floors are cleaned to maintain sanitary conditions and to protect them from damage. Methods suggested in this manual result from practical experience and research.

*3.1.2.1 Sweeping.* Dirt can be removed with a vacuum cleaner, by sweeping with a brush or broom, or by the use of a dry or treated sweeping mop of the proper design. Degree of sweeping efficiency has both a direct and indirect bearing on the cost of cleaning, such as:

- (1) Overall appearance of floors.

- (2) Standard of dust control throughout the building.

- (3) Custodial funds expended for sweeping operations.

- (4) Custodial funds expended for floor finishing.

- (5) Custodial funds expended for other custodial operations.

- (6) Thorough removal of foreign particles from floor surfaces minimizes wear.

*3.1.2.2 Sweeping Tools.* Sweeping tools used on various kinds of floor coverings are shown in Table 4. The best approach to efficient sweeping is to determine the type of sweeping equipment best suited to each floor area considering the degree of obstruction, type of floor surface, and whether the floor is sealed or not sealed. In offices and other areas containing equipment, a smaller size sweeping tool can cover the area with greater efficiency in maneuvering. Power sweeping large areas can cut floor sweeping time up to 90 per cent.

The average coverage per hour for a walking-type sweeper is about 20,000 square feet with a sweeping swath of 39 inches. A small riding-type with a 40 inch swath will cover about 30,000 square feet per hour. A 36 inch to 48 inch broom or sweeping mop should be used for corridors or open areas to minimize the number of passes. A V-type sweeping mop which can be adjusted in width from 6 to 57 inches serves both purposes. Neither bristle brushes nor sweeping mop are used to pick up heavy dirt or mud. Corn brooms are used for this purpose. Dirt gathered by brush, broom or V-type sweeping mop is picked up in a dustpan and emptied into a dust container. Dirt and dust from straight sweeping mops is shaken directly into the

dust container. Detailed instructions for handling and use of sweeping tools are given in another chapter.

**3.1.2.3 Frequency of Sweeping.** The sweeping frequency may vary for different floor areas depending upon the nature of work of the building occupants, amount of floor traffic, dust and dirt exposure, standard of cleanliness, local weather conditions, nature of soil, condition of grassed areas around buildings, and adequacy of sidewalks. Table 1 provides a guide for frequency of sweeping under average conditions.

**3.1.2.4 Sweeping Standards.** A properly swept floor should not have dust streaks, marks, dirt in corners, behind radiators or doors, or under furniture. Furniture and other equipment moved during sweeping should be replaced (see glossary for "movable furniture"). Baseboards, equipment and

furniture should not be disfigured by sweeping mop or broom. The room should appear orderly and well attended.

**3.1.3.1 Mopping.** Mopping removes dirt which sticks to the floor surface and cannot be removed by sweeping or by dry cleaning. Water and detergent loosen and suspend the dirt so that it may be removed. The mop is used to spread the washing solution and rinse water, to rub sticky dirt loose from the floor, and to pick up the washing solution and rinse water. This washing action of both soaps and detergents is performed in three steps.

- (1) Wetting the soil and the surface of the object being washed.
- (2) Removing the soil from the surface.
- (3) Keeping the soil in solution and suspension. Water has a property known as "surface tension," which makes it act as

Table 4-1—Sweeping Tools Used on Different Kinds of Floor

| Kind of floor surface                                 | Tool to be used     |                   |            |              |           |                   |
|---|---------------------|-------------------|------------|--------------|-----------|-------------------|
|   | Bristle floor brush | Fiber floor brush | Corn broom | Sweeping mop |           |                   |
|   |                     |                   |            | Treated*     | Untreated | Powered equipment |
| Rough, unpainted, or unsealed open-grained wood floor |                     | XX                | X          |              |           |                   |
| Smooth, unpainted, or unsealed wood floor             | X                   | XX                |            |              |           |                   |
| Smooth, sealed, or painted wood floor—not waxed       | X                   |                   |            | XX           |           |                   |
| Smooth, sealed, and waxed wood floor                  | X                   |                   |            | XX           | XX        | XX                |
| Linoleum—waxed  |                     |                   |            | XX           | XX        | XX                |
| Asphalt tile—not waxed                                | X                   |                   |            | XX           | XX        | XX                |
| Asphalt tile—waxed                                    | X                   |                   |            | XX           | XX        | XX                |
| Vinyl—not waxed                                       | X                   |                   |            | XX           | XX        | XX                |
| Vinyl—waxed   | X                   |                   |            | XX           | XX        | XX                |
| Terrazzo  |                     |                   |            |              | XX        | XX                |
| Mosaic tile   |                     |                   |            | XX           | XX        | XX                |
| Quarry tile   |                     |                   |            | XX           | XX        | XX                |
| Rubber tile   | X                   |                   |            | XX           | XX        | XX                |
| Rubber tile—waxed                                     | X                   |                   |            | XX           | XX        | XX                |
| Rough concrete  |                     | XX                | X          |              |           |                   |
| Smooth concrete—not treated to eliminate dustiness    | X                   | XX                |            |              |           |                   |
| Smooth, treated, or painted concrete                  | X                   | X                 |            | XX           | XX        | XX                |
| Quartz chloride cement                                | X                   |                   |            |              | XX        | XX                |

Note: XX means that the tool is to be used if equipment is available. X means that the tool is to be used only if tool marked XX is not available. Where two tools are checked with the same symbol, either may be used.  
 \*Use a liquid emulsion mop-treating compound. Do not use an oil emulsion nor an oil base.

though it is covered with a thin elastic film. This "surface tension" prevents water from getting in, under and around the small particles of dirt on the surface to be cleaned. By adding soap or detergent to water, this tension is decreased so that it will break upon contact with the particles. This permits the solution to get in and around the dirt and loosen it so that it may be picked up with a damp mop. Extensive damage can be done to floors by using excessive water and strong cleaning agents. Damage can be minimized by strict adherence to the following rules:

(a) Use water sparingly, only enough to do the job.

(b) Never use a mopping solution stronger than necessary to remove dirt. Many jobs can be done with clear water.

(c) Use only clear water on conductive floors.

(d) Allow solution to loosen dirt, then remove. Flooding of floor must be avoided at all times.

(e) Mop, rinse, and dry one small area of floor at a time. This reduces the time that the solution remains on the floor.

(f) Change water frequently. Dirty water will not wash clean. This applies both to wash and rinse water.

(g) Do not splash baseboards, furniture, and other equipment with mop water. If legs of furniture become dark from mop water or wax, clean them with a soft cloth and a solution of warm water and neutral detergent. Rinse with clear water and dry with a cloth.

(h) Do not allow water to seep under furniture, baseboards, or equipment. Apply masking tape around bottom of cabinets to prevent solution from seeping underneath and eventually causing rust stains to the floor surface.

(i) Difficult places, such as corners or behind radiators, should be mopped by hand. This can be accomplished by grasping a portion of the mop in your hand and using it as a scrubbing cloth.

(j) All mopped floors shall present a clean appearance free from streaks, smears, or dirt residue.

(k) Light spot cleaning with a damp mop and clean water may be required periodically in limited areas.

*3.1.3.2 Frequency of Damp Mopping.* Frequency of damp mopping will depend upon weather conditions, amount of traffic, and type of floor surface. Rough or porous floors need mopping more often than smooth, sealed floors. Table 1 provides guidance for frequency of damp mopping and other cleaning operations under average conditions.

*3.1.3.3 Mopping Methods and Solutions.* Table 5 describes the solution and method used for mopping floors and floor coverings. Details are given in paragraphs 6.2.13 through 6.2.19.5. Instructions for damp mopping conductive floors are given in paragraph 3.1.7.10 and 6.2.38.

**3.1.4 Scrubbing.** Floors should be scrubbed only when they cannot be cleaned satisfactorily by mopping. Scrubbing is performed with a disk type or automatic floor machine using a bassine fiber brush or synthetic scrubbing pad. The general rules for mopping apply. Scouring powder should be avoided. However, if it must be used, sprinkle powder lightly on floor before scrubbing. When using solutions stronger than all-purpose synthetic detergent solution, wear rubber gloves to protect the hands. Water or scrubbing solution should not remain on floor longer than absolutely necessary. Wood floors should be scrubbed with the grain.

*IMPORTANT:* Floor scrubbing should be kept to an absolute minimum. If floors are properly maintained, they seldom need scrubbing.

**3.1.5 Dry Cleaning.** Floors should be dry-cleaned where possible rather than mopped. One method of dry cleaning is performed by use of a disk-type machine equipped with a number one steel wool pad and vacuum attachment. If the floor has been sealed and is in good condition use steel wool to clean it

*3.1.5.1 Disk-Type Machine.* A small disk-type machine with a steel wool pad or a synthetic cleaning pad may be used to dry-clean floors in small congested areas.

Table 5—Mopping Solutions

| Kind of floor surface   | Mopping solution  | Wet mop scrubbing  | Damp mop                                    | Rinse                    | Remarks  |
|---|---|--|---|--------------------------|--|
| Unpainted, unsealed wood.   | ¼ to 1 cup of synthetic detergent in 1 gal of water.                      | Only if very dirty, or dirt has set.   | Preferred. Use as little water as possible. | Yes. Change water often. | Avoid alkalis; GI soaps or strong solutions of trisodium phosphate emulsify oils and gums in wood. Water softens fibers causing rapid wear. Remove water immediately.  |
| Sealed wood or painted wood, not waxed.   | ¼ to ½ cup of synthetic detergent in 1 gal of water.                      | Only if very dirty or dirt has set.  | Preferred. Use as little water as possible. | Yes. Change water often. | While paint and seals are not attacked by water, they are by alkali GI soap, and all strong cleaning solutions. Rinse carefully and remove water immediately.  |
| Waxed wood, linoleum, asphalt tile, vinyl.  | Clear water and small amount of synthetic detergent only.                 | Only to remove wax.  | Yes. Use as little water as possible.       |                          | Do not use soap or any other cleaning agent except to remove dirt. Mop only if floor cannot be dry cleaned.  |
| Unwaxed linoleum, asphalt tile, rubber, mastipave, vinyl.                         | Clear water. If very dirty, use all-purpose synthetic detergent solution. | Never let water stand on these floors. Water in seams loosens floor coverings. | Yes. Use as little water as possible.       |                          | These floor coverings are impervious to most dirt, and clear water will remove everything except grease and some stains. alkali GI soap emulsifies linseed oil in linoleum. Strong trisodium phosphate is equally destructive. |
| Unwaxed oxychloride cement  | Clear water. If very dirty, use all-purpose synthetic detergent solution. | Only if very dirty. Change solution often.                                     | Preferred. Change water often.              | Yes. Change water often. | Strong acids or alkalis attack floors and cause deterioration. Mild acids and alkalis scar them.   |
| Terrazzo, mosaic tile, quarry tile, flagstone, slate, marble, unpainted concrete. | All-purpose synthetic detergent solution.                                 | Only if very dirty. Change solution often.                                     | Preferred. Change water often.              | Yes. Change water often. | Alkali GI soaps and strong solutions of trisodium phosphate attack marble, slate, terrazzo, and the like, and cause pitting and rapid wear.  |
| Painted concrete.   | Same as for painted wood.   | Only if very dirty.  | Preferred.                                  | Yes.                     | See remarks on painted wood floors.  |

Instructions for operating this machine are found in paragraphs 6.2.20.1 and 6.2.24. Figure 3 shows machine in operation.

3.1.5.2 *Frequency of Dry-Cleaning.* Properly sealed and waxed floors and waxed resilient floor covering may be dry-cleaned between rewaxing in lieu of periodic damp mopping and buffing. Steel wool pads will not be used on rigid floors such as terrazzo, marble, concrete, oxychloride cement, etc.

3.1.6 **Waxing.** Table 6 indicates waxes and finishes recommended for different types of floors.

3.1.6.1 *Water Emulsion Wax.* This wax may be applied with a lambswool applicator or an ordinary mop. If a lambswool applicator is used, pour the wax into a shallow pan. Wax should be ½ inch deep in pan. (An empty five-gallon wax drum cut to a height of three inches makes a good pan for



Figure 3. 20" Floor Polisher.

this purpose.) Dip applicator in wax and wipe surplus off on side of pan. Apply a thin, even coat to an area about 6 X 6 feet, first one way, and then cross-wise. Once wax starts to dry, do not touch it with applicator. If mop is used, wash mop to make certain no cleaning solution remains. If possible a special mop should be kept for waxing operations only. Soap or detergent destroys the waterproof qualities of wax. After washing, wet the mop in clear water and wring it dry as possible. Pour just enough wax to do the job in a clean mop pail. Wet mop in wax and wring out excess. Apply a thin, even coat to floor. Do not rub with mop after applying.

Complete instructions are given in paragraph 6.2.23. For longer durability and high gloss, apply one coat of wax, buff, then add a second coat of wax and buff again. After the waxing operation is completed, the left over wax should be disposed of and not be returned to the container.

(1) *Buffing.* Wax should be thoroughly dry before buffing. Drying time depends on amount of air circulation and the temperature. If the dry cleaning method is not used, use a disk-type buffing machine (paragraph 6.2.20) with tampico brush or with a fine synthetic polishing pad. A lambswool pad can be placed under the brush of the disk-type machine to remove brush marks.

(2) *Important Points on Use and Maintenance of Wax Floors.*

(a) To prevent buildup of successive layers, wax should not be applied closer than 6 inches adjacent to walls, partitions, or fixtures, except for the first coat. A buffing machine will spread sufficient wax to these little-used traffic areas.

(b) Waxed floors should be vacuumed or swept with a sweeping mop or brush broom as often as necessary to keep the floors reasonably free from dust or abrasives.

(c) Dry clean periodically with disk-type floor machine with fine steel wool pad

Table 8—Wax and Floor Finish Data

| Kind of floor or floor covering | Kind of wax to use |                    |                                       |
|---------------------------------|--------------------|--------------------|---------------------------------------|
|                                 | Spirit Wax         | Water Emulsion Wax | Resin Emulsion Finish                 |
| Wood (not sealed or varnished)  | Yes                | Never              | Never                                 |
| Wood (well sealed or varnished) | Yes                | Yes                | Never                                 |
| Linoleum                        | No                 | Yes                | Yes                                   |
| Asphalt tile                    | No                 | Yes                | Yes                                   |
| Mastic pave                     | Yes                | Yes                | Yes                                   |
| Rubber                          | No                 | Yes                | Yes                                   |
| Cork                            | Yes                | Yes                | Yes                                   |
| Vinyl                           | Yes                | Yes                | Yes                                   |
| Oxychloride (not sealed)        | No                 | Yes                | Yes                                   |
| Oxychloride (sealed)            | No                 | Yes                | Yes                                   |
| Vinyl Asbestos                  | Yes                | Yes                | Yes                                   |
| Conductive floors               | Never              | Never              | Never                                 |
| Terrazzo                        | No                 | Never              | Water-Emulsion Resin<br>(See Table 2) |

to remove heavy soil and traffic marks. In lieu of the dry cleaning machine, damp mop with clear water, and buff.

(d) Wax heavy traffic areas as often as necessary to protect floors.

(e) When waxed floors cannot be maintained satisfactorily all wax should be removed by mopping with wax remover solution followed by plain water mop-rinse, and rewaxing.

(f) Built-up wax may require scrubbing with steel wool. The wax removers are formulated for use primarily on asphalt, rubber, linoleum, vinyl, vinyl asbestos and mastipave floor coverings and should not damage these floors if properly used. In the absence of prepared wax remover, ammonia in solution with synthetic detergent and water may be used. However, take care to use only enough ammonia to remove the wax effectively.

(3) *Waxing Standards.* A properly waxed floor should have a thin, even coating. Floor should be clean and bright in corners and under furniture as well as in other areas. Wax should be huffed to a uniform sheen, leaving no heavy brush marks.

(4) *Black Marks or Rubber Burns may be Removed by Spot Cleaning.* An effective way to accomplish this is to affix a piece of synthetic scrubbing pad between the mop head and handle clamp so that approximately six to eight inches are on either side. Dip mop in a solution of water emulsion wax and water and spot scrub marks and buff, figs. 4 and 5.

(5) *Spray Cleaning.* Spray maintenance is not a complete floor treatment. It is an interim process to make the regular finish last longer, look better and reduce labor costs. It is adapted for all types of floors, but more so for the resilient types than others. It is needed most where traffic is heaviest. Consequently, the refinishing of the entire floor each time a new application is made is unnecessary, and the logical system is to reapply a finishing coat only when it is needed. In most cases, refinishing the floor twice a year, should suffice, provided the proper interim methods are observed. This not only means



Figure 4. Damp Mop with Abrasive Pad.



Figure 5. Attaching Abrasive Pad to Heel of Damp Mop.

a considerable saving in time and material, but eliminates the great inconvenience of the more frequent messy job and the taking of the floor out of use. While the spray method may be used with cleaning solution alone, serving as a limited scrubbing operation for not too dirty floors, using a minimum of water; the chief and more popular function is the simultaneous cleaning and finishing operation. The spraying devices vary, some are attached to the machine handle and supply the liquid automatically, some are attached to the machine proper while another is held in the hand. However, the principle function is to spray a misty coating on the floor just



**Figure 6. Spray Cleaning.**

ahead of the floor machine, under which an absorbent pad, either steel wool, synthetic, or non-woven nylon pads, draws the dirty coating up into its body while it leaves enough finish material on the floor to respond to the buffing as the machine proceeds, fig. 6. Completely integrated systems, which make the sprayer and floor machine a single unit, enable the operator to maintain heavily trafficked areas in less time than the usual conventional method and involves only half as many steps. Because less water and harsh cleaners are used, the floors last longer. By the spray application the refinished spaces blend in with the rest of the floor. The advantage of the spray method over the conventional method is the elimination of mops, buckets, vacuum cleaner, and machine scrubbing. A dirty floor may be safely cleaned and polished by the spray method. The floor is safe to walk upon soon after the floor machine has passed on. Both the self-polishing water emulsion waxes and the polymer resin

finishes are usually adapted to the spray method. The nature of the spray itself is important, since a coarse spray may result in small puddles of the solution on the floor. When a cleaner alone is used, this would probably be no disadvantage, but when the solution contains wax or polymer emulsion, the puddles are more difficult to get spread out on the floor before they dry. When a poly-resin finished floor becomes dull or marred, often clear water sprayed in a fine mist ahead of the floor machine will restore the gloss. Spray only where the traffic wears the base finish or where scuffs and marks appear. Hospitals can add disinfectants to the regular spray cleaning solution to reduce bacteria count. As much as one cup of disinfectant may be added to a gallon of spray solution.

(6) *Hand Spray Bottle Technique.* The use of the hand spray bottle, which can be easily carried in the custodian's pocket, is an efficient method for applying a 50 per cent mild liquid detergent solution on a soiled area. After the spray is applied, wipe it off immediately with a clean soft cloth or a nylon web pad. This method prevents dripping and running. Moist sponge or water is not required to clean up after application of the spray solution. This technique is a direct follow-up of spray cleaning method used on resilient tile flooring.

### **3.1.7 Types of Floors and Treatment:**

#### *3.1.7.1 Wood Floors:*

(1) *Effect of Strong Soap and Water.* The most common floor woods are maple, oak, pine, and fir. Maple and oak are hardwoods and are more resistant to water and wear. Because there is no apparent difference between hard and soft layers of maple flooring, it is called a close grained wood. Oak, pine, and fir grain consist of alternate layers of quite hard and soft fibers. These are called open-grained woods. Open-grained woods are likely to splinter if the soft, pulpy part of the grain is eaten away by the lye in strong soap. This leaves the hard grain without support, which causes splinters and

Table 7—Waxed Floor Maintenance Guide

| <i>Problem</i>  | <i>Cause</i>  | <i>Remedy</i>   |
|---|---|---|
| Inadequate Gloss  | Floor finish too thin   | Apply two thin coats evenly. Wait 72 hours if third coat is needed.   |
|   | Floor not properly cleaned and/or rinsed  | Use wax stripper, rinse thoroughly. Two applications may be required for heavily soiled floors.   |
|   | Porous Floors   | Thoroughly wax strip, apply coating to fill pores, and apply wax or polymeric finish; avoid frequent stripping.   |
| Tacky or Sticky Finish  | Too much Polish   | Allow each thinly applied coat to dry before subsequent coats.  |
|   | Polish applied over improperly rinsed floor                                     | Rinse with clean water and wring out mop in separate bucket of water. Change rinse water frequently.  |
|   | Use of Improper Polish  | Never use solvent waxes on resilient floors. Read directions as to which floor polish may be used.  |
| Excessive Black Marking                                       | Inadequate amount of floor polish   | Build-up enough coats for a protective coating. Buff often.   |
|   | Poor Quality Finish   | Use better quality materials.   |
| Swelling of Rubber Tile                                       | Use of solvent type cleaners or strong soaps                                    | Clean swollen floor with neutral detergent; burnish with #00 steel wool pad and let dry for several days. Apply a base coating to seal pores and then apply a polymeric finish. Do not use solvent waxes or strong soaps on rubber tile.  |
| Sticking of Chairs and other objects                          | Too long a drying time, especially under humid conditions                       | Use finishes with a short drying time.  |
|   | Polish too heavy  | Strip the floor and start again with thin coats, allowing drying time between coats.  |
|   | Softening of the floor  | Clean and strip the floor. Let floor harden for several days, then apply floor finish.  |
| Pebbling of Cork Tile   | Excessive moisture and/or heat  | Avoid use of cork flooring where there is excessive moisture or heat. Do not use alkaline cleaners or solvents on cork, use neutral detergents. Do not use oily dust mops or sweeping compounds; use only wax-base dust mop treatment. If condition is severe, contact cork manufacturer. |
| Warping or Buckling of Vinyl Asphalt or other Resilient Tiles | Water detergent seepage between tiles, which damages adhesive and loosens tiles | Use wet vacuum to pick-up cleaning solutions and rinse water, or clean and rinse in small areas, removing all water before moving on to next area. Once tiles are warped they should be replaced.   |
| Loosening of Ceramic Tiles                                    | Alkaline detergents attack grout between tiles                                  | Use neutral detergents. Replace grouting and damaged tiles.   |
|   | Deposit of soap film which attacks grouting                                     | Do not use soap products to clean ceramic tile. Use neutral detergents.   |
| Cracking, Spalling or Staining of Terrazzo Floors             | Alkalies seep into pores and attack cement. Acids dissolve marble               | Use synthetics, never alkalies to clean terrazzo. Clean-up acids immediately (even fruit juice or soft drinks) with neutral detergent or clear water.   |
|   | Rust stains caused by steel wool used for cleaning and buffing marble           | Do not use steel wool on terrazzo, clean with cotton or rayon mop. Scrub with fine nylon pad. Seal with terrazzo sealer.  |



Table 7—Waxed Floor Maintenance Guide—Continued

| Problem  | Cause   | Remedy   |
|--|---|--|
| Discoloration of Vinyl Floors from Rubber Runners or Desk Feet | Vinyl reacts with anti-oxidants in the rubber                   | Abrade with coarse nylon pad or steel wool. Clean thoroughly, apply one or two coats of polymeric finish, to afford resistance to rubber staining. |
| Powdering  | Polymeric finishes used over wax                                | Strip floor, apply base coat, then one or two coats of polymeric finish.   |
|  | Polish too hard and brittle                                     | Select another brand that is durable and not brittle.  |
| Whitening  | Use of too abrasive pad or too coarse steel wool                | Use fine grade nylon pad for buffing, or a polishing brush if wax coating has shown evidence of abrading.  |
|  | Use of hot cleaners, solvents, or harsh alkalies                | Use neutral cleaners in warm water. Avoid alkalies or solvents on resilient flooring.  |
| Washed-out Appearance  | Use of dust mops treated with oil-base agents                   | Strip the floor, burnish with #00 steel wool or fine nylon pads. Apply floor finish and use only wax-base mop treatment.                           |
|  | Too frequent cleaning   | Review cleaning schedules.   |
| Color Bleeding   | Harsh cleaners  | Use neutral detergents.  |
|  | Abrasive materials  | Use finest grade of cleaning pads. Powders are not recommended on resilient floors.  |
|  | Solvent cleaners or polishers                                   | Never use solvent products on resilient floors. Use neutral cleaners and water-emulsion finishes.  |
| Color Fading   | Harsh alkaline cleaners or abrasive materials                   | Bleeding is the transfer of color from the flooring to the cleaning solution which represents an attack on the flooring. Do not use.               |
|  | Direct sunlight   | Use curtains, screens, louvers, or tinted glass.   |
| Streaked Appearance  | Strong cleaners   | Use neutral detergents.  |
|  | Too little polish during application                            | Follow manufacturer's instructions.  |
|  | Use of dirty mops   | Wash mopheads after waxing. Discard old, worn, or stained mops.  |
|  | Poor rinsing  | Immediately pick-up water with a wet vacuum, or use a double rinse mopping outfit and change rinse water often.                                    |
| Yellowed Film  | Poor quality floor finish                                       | Use a better quality brand.  |
|  | Polish too thick  | Apply each coat evenly and thinly. It is easier to add thin coats than to get rid of too thick a one.  |
|  | Excessively heavy coats of polish                               | Apply in thin, uniform coats.  |
|  | Too frequent application of polish, and/or infrequent stripping | Wax less often, or strip more often. Schedules should be followed.   |
|  | Use of a floor finish having a yellow cast                      | Select a clear, colorless polymeric finish.  |
|  | Recoating entire floor every time floor is cleaned              | Do not wax the non-trafficked areas as often.  |

rough flooring. While the lye in soap acts on wood, water causes wood to swell. When water is first applied to a wood fiber, the individual boards bulge upward in the center. This happens because the top of the board has swelled. Repeated mopping or scrubbing causes the wood to become saturated. When damp wood is drying, the top surface dries first, contracting and pulling the edges of the board upward, which causes them to wear rapidly and to break easily. Warping opens the grooves between boards, which allows collection of water and dirt. Dirt holds water, which causes rotting of boards and rusting of nails. Continued expansion and contraction cause the rusted nails to break, resulting in loose boards. Water seeping through the spaces between boards soaks the subfloor and joints, causing further damage.

(2) *Recommended Treatment for Wood Floors.* Wood floors, when new and in good condition, should be sealed with a penetrating seal (Federal Specification TT-S-176d), and waxed with spirit type liquid or paste wax (paragraph 3.1.6). When floors are not badly splintered, the dry-cleaning method should be used. Floors should be swept with a hair brush or sweeping mop. If mopping or scrubbing is necessary, use a mop dampened in all-purpose synthetic detergent solution. (table 5.) Leave the water on the floor only long enough to clean it.

3.1.7.2 *Linoleum.* Linoleum generally consists of ground cork, wood flour, and oxidized linseed oil. These are thoroughly mixed and pressed into a sheet against a backing of burlap or felt. The linseed oil binds the particles into a waterproof substance. The felt paper acts as a cushion and protects the linoleum from irregularities in the floor.

(1) *Effect of Water and Strong Detergents that are Highly Alkaline on Linoleum.* Application of too much water or strong detergent solution will destroy linoleum. Water seeps between the seams of linoleum strips or under the edges, taking dirt and soap with it. This loosens the binding cement and allows linoleum to curl. Traffic over loose and curled areas will cause cracks in

linoleum. Trisodium phosphate emulsifies the linseed oil in the linoleum and causes a grainy and lifeless appearance. Cork particles break loose because the linseed oil binder has been removed.

(2) *Recommended Treatment of Linoleum.* At the factory, linoleum is usually given a thin coating of lacquer, followed by a light waxing. This seals the surface and prevents dirt from being embedded. The wax also provides surface protection. As lacquer and wax wear off quickly, constant rewaxing is necessary to keep the surface sealed. If the floor is not waxed by the dry-cleaning method water emulsion wax should be used. For application of water emulsion wax, see paragraph 6.2.23. When linoleum is mopped, use clear water unless the surface is very dirty or wax is to be removed. If wax is to be removed, use a lukewarm solution of wax remover. Never use a soap or cleaning agent containing lye. Do not allow water to seep under the edges or between seams.

3.1.7.3 *Asphalt Tile.* Asphalt tile consists of asphaltum, asbestos fibers, and the remainder of lime rock, wood flour, and colored pigments. Asphaltum binds the materials together. Asphalt tile is usually cemented directly to concrete floor or to a felt and sheet hardboard underlayment over wood subflooring.

(1) *Effect of Strong Soap, Solvents, and Water on Asphalt Tile.* Asphalt tile reacts very much in the same manner as linoleum to strong soaps, water and solvents. Soap containing lye forms an emulsion with asphaltum, causing the colors to bleed or run. Solvents and oils dilute asphaltum and soften tiles. For this reason, sweeping compounds of an oily nature should not be used on asphalt tile. Water seepage between seams or under edges of tiles loosens the cement and causes the edges to break or crumble under traffic.

(2) *Recommended Treatment of Asphalt Tile.* Clean floor by mopping lightly with a damp mop and all-purpose synthetic detergent solution. Water emulsion wax must be used in all cases as a base coating. It is buffed with a disk-type machine. Daily

maintenance consists of sweeping with a dry or a treated sweeping mop. At regular intervals, between waxings, tile should be dry-cleaned by using number "0" steel wool or equal synthetic fiber disc and wax applicator. Sticky dirt in this operation is removed by damp mopping with warm water containing a small amount of water emulsion wax. This removes soilage and leaves a light, protective, wax coating.

*3.1.7.4 Rubber Tile.* Rubber tile is made of natural or synthetic rubber, pigments for color, and aggregates to give body. Water and dirt do not penetrate it. Rubber tile returns to shape after being under stress. Strong soaps, oils, or solvents damage it. Water seepage between or under edges will loosen tiles or strips. Unless it is well waxed, rubber tile tends to form a powdery surface.

(1) *Recommended Treatment for Rubber Tile.* Maintain rubber tile floors in the same manner as asphalt tile floors. Rubber heel marks can be removed by rubbing with number "0" steel wool and/or washing with all purpose synthetic detergent solution and/or spray cleaning.

*3.1.7.5 Terrazzo.* Because of its durability, architectural attractiveness and ease of maintenance, it is used today in unlimited designs and colors for floors, stairs, sidewalks, pools and other applications. While no modern flooring material requires less attention, even terrazzo should have proper care. Such care makes the difference between a beautiful floor or just another wearing surface.

(1) *Composition.* Marble and cement, in a two-to-one ratio, constitute the basic ingredients of terrazzo. During installation, more marble is sprinkled on top of the mixture so that marble comprises at least 80 per cent of the finished surface. Since marble is practically non-porous, it absorbs few, if any, staining substances and does not require protective surface coating. However, the matrix or portland cement binder is porous and therefore susceptible to stain. A virtually stainproof floor requires the use of newer, non-porous synthetic cements.

(2) *Maintenance.* Waxes will temporarily protect the porous binder, but such coatings wear off readily and tend to make the surface slippery. Also, a waxed surface holds dirt and requires frequent stripping, adding to cleaning chores.

For best results, protect the flooring internally rather than superficially. Penetrating sealers, which are absorbed by the cement, seal the pores and this greatly reduces the absorbent quality of the binder.

(a) Some cleaning materials can damage terrazzo quarry and ceramic tile floors. Use neutral liquid cleaners. They should have a PH range of 7 thru 10 and be free of any alkali, acid or other chemical that may ruin the floor. The National Terrazzo and Mosaic Association cautions that soaps and scrubbing powders containing water solubles, inorganic salts or crystallizing salts should never be used to clean terrazzo.

(b) The volume of traffic normally determines the frequency of cleaning. Apply cleaners as instructed by the manufacturer's directions. Wet mop the solutions onto the floor and allow the prescribed period for grime-dissolving action to take place. Then squeegee, wet vacuum, or mop up the dirty solution from the floor.

(c) Be sure to keep the floors wet at all times during the cleaning operation. This prevents the dissolved soil from drying on the floor and acting as an abrasive. Also, when rinse-mopping a cleaning solution, keep the rinse water, mops and pails clean to assure complete removal and to avoid any mop lines. The normal daily wet mopping does not remove all dirt. Thus periodic cleaning with an electric scrubbing machine and a solution of neutral cleaner becomes an important part of the cleaning program.

(d) If you use a mop dressing in daily sweeping, be sure it is non-oily. Besides being a fire hazard, oily sweeping compounds generally attract and hold small particles of sand. These are difficult to sweep and abrade the surface. Oils, in any form, can penetrate the surface and will permanently discolor terrazzo floors.

(e) No flooring material, not even terrazzo under constant use, remains free from stains. Fruit, chewing gum, carbonated beverages, tobacco and a myriad of other items constantly attack heavily used floors. Since stains become more difficult to remove when dry try to remove them as quickly as possible. If possible don't treat stains until they are identified. Only as a last resort should removers be used on unknown stains. Stain removers fall into one of three general classifications; solvent, absorbent or bleach. Solvents dissolve greases, oils, colloids and similar materials. Absorbents such as chalk, talcum powder, blotting paper or cotton absorb most wet-staining substances. Common household chemicals such as chlorox, ammonia, hydrogen peroxide, acetic acid and lemon juice can actually discolor, or stain, the floor.

The following list of remedies covers most stains:

1. Water will remove most water-base stains.
2. Alcohol will remove most alcohol stains.
3. An alkali will neutralize most acid stains.
4. An acid will neutralize most alkali stains.
5. Use soap for most of the grease stains.
6. Use a cold or cool remover on stains that contain albumen (milk or blood). Heat cooks the albumen and sets the stain on the floor's surface.
7. When using chemicals to remove stains, follow directions carefully. *For example*, if a procedure specifies treatment with a solvent prior to cleaning, don't reverse the procedure. If reversed, the alkali in the soap would set the stain and make removal virtually impossible. Should you encounter heavy or intense staining, obtain professional service from a reliable terrazzo contractor to avoid damaging the surface.

(f) Finally, when purchasing janitorial supplies, don't consider only how far or how many square feet the product will cover,

but more important, evaluate how long and how well it will serve you. The more expensive product may be the most economical in the long run.

**3.1.7.6 Marble.** Marble floors are subject to staining by oils, iodine, mercurchrome, blood, and rust. Strong soaps and cleaners open pores and tend to make floors more water absorbent. Wax makes them slippery.

(1) *Recommended treatment of marble floors.* Maintain in the same manner as terrazzo floors. Stain removal data may be found in Table 3.

#### **3.1.7.7 Concrete Floors:**

(1) *Cleaning.* A new concrete floor should be allowed to age at least 21 days before applying a sealing and hardening compound. The floor should be thoroughly cleaned by sweeping or vacuuming and using a floor scrubbing machine with a wire bursh. After scrubbing, the solution is removed with a mop or with a scrubbing machine equipped with a squeegee and vacuum. The floor should then be thoroughly rinsed with clear water. Remove rinse water with a mop or floor scrubbing machine.

(2) *Hardening.* Apply a concrete hardener and etcher according to manufacturers instructions. This is normally applied with a sprinkling can to get even distribution. Keep the surface wet for about 30 minutes and during this time scrub with a floor machine equipped with a scrub brush. Flush with plenty of clear water and pick up residue with vacuum cleaner equipped with a squeegee or pick up with a mop. Allow floor to dry thoroughly, preferably 24 hours.

(3) *Sealing.* Floor sealing should be accomplished strictly in accordance with manufacturer's instructions. The method may vary depending upon whether the floor is subject to spillage of materials containing solvents.

(4) *Waxing.* After seal is thoroughly dry, apply a thin coat of water-emulsion floor wax. The wax should be applied with a lambswool applicator or suitable mop. Do not apply the first coat nearer than six inches to the wall. Apply a second thin coat to the

entire floor area. When wax is dry, buff with a polishing brush after each application.

#### 3.1.7.8 Vinyl:

(1) *General.* Vinyl flooring is a resilient, plastic material and has a high tensile strength. It is impervious to tracked-in dirt, is not affected by mild acids or alkalies, and is extremely resistant to grease and oils. It has an exceptionally tough wearing surface. It resists traffic marks and scratches, and even pointed heels fail to penetrate the surface. It is cemented to the floor in the same manner as asphalt tile or linoleum. In the treatment of stains on vinyl flooring it is essential to identify the type of vinyl before the treatment of stain removal. If the tile is, in fact, vinyl asbestos, it would be harmful to use harsh alkaline cleaners or scouring powders, as these cause the tile to lose its plate finish and become porous, allowing stains to penetrate. Pure vinyl will not readily lose its plate finish, so the stains are not likely to penetrate to the same extent. Persistent staining indicates that the surface has become porous and is retaining dirt, or that there has been spillage of some bleaching or corrosive agent onto an unprotected surface. If the stain penetrates the entire thickness of the tile it may be impossible to remove. Sanding or abrasives damage the surface, making the floors more porous and retentive of dirt and dampness, and while sanding with a disc sander would not be practicable because only the high spots would be removed from so flexible a floor covering.

(2) *Recommended Treatment of stain removal on Vinyl Flooring.* A possible treatment for bad staining would be to clean thoroughly with a deep tone powder cleaner, the entire area being treated and several applications being made to the stained portion if necessary. For additional information on removal of stains on vinyl flooring see Stain Removal Guide Table 3.

(3) *Recommended Treatment of Vinyl Flooring.* After thorough rinsing and drying, apply one or two coats of semi-permanent seal and top dressing of semi-buffable emulsion polish which should be well buffed. A damp-mopping and daily

sweeping routine should keep the floor in good condition. Floors may be mopped if necessary. Allow detergent and water on floors only long enough to clean. Seepage between tiles or under edges causes the cement to lose its holding power. This type of floor covering requires waxing to protect the surface from grit. Occasional damp mopping and buffing is required, with most of the cleaning done by dry sweeping mop.

#### 3.1.7.9. Oxychloride Cement:

(1) *General.* This cement contains chemical compound of magnesium and magnesium oxide to which are added various aggregates such as asbestos, silex, sawdust, marble flour, marble chips, or sand, depending on the type of surface desired. It is resistant to grease and oils. Strong acids will dissolve it, while weak acids will scar it.

(2) *Recommended Treatment of Oxychloride-Cement Floors.* Oxychloride cement floors should be treated with a penetrating seal. Floors are then given a light coating of water emulsion wax and buffed. The dry-cleaning method of waxing and polishing may be used. Sweep with a dry sweeping mop or hair brush. Floors may be mopped or scrubbed with warm, all-purpose synthetic detergent solution. Under no circumstances should caustics, lye, GI soaps, or trisodium phosphate be used in cleaning as they deteriorate surfaces and cause colors to fade. Oxychloride cement should not be subjected to continuous scrubbing, even with clear water. Stain removal data is found in table 3.

3.1.7.10 *Treatment of Conductive Floors and Floor Covering.* Conductive floors are usually found in hospital operating rooms where explosive anesthetic gases are administered. The flooring, aside from serving as a finishing material, also grounds static electricity. In this way, it prevents electrical sparks and the explosion of gases. Use of water on these floors lowers or destroys the ability to ground electricity. Use of soap or detergent has the same effect. If mopping is required, a slightly damp mop using clean water only should be used. Water should not

be allowed to stand on floors. A dry brush, broom, or untreated sweeping mop should be used for sweeping. For sweeping instructions, follow applicable portions of paragraphs 6.2.3 through 6.2.12. Instructions for damp mopping of conductive floors are found in paragraph 6.2.38.

3.1.7.11 Miscellaneous Floor Coverings: manner as linoleum.

(2) *Mastipave*. Treat in the same manner as asphalt tile.

(3) *Ceramic or Quarry Tile*. Treat in the same manner as terrazzo.

### 3.1.8 Rug Cleaning:

(1) Rugs and carpets are designed to withstand an average amount of punishment, however the average is determined to a large extent to the day-to-day care it receives. Routine use of carpet sweeper or vacuum sweeper and immediate attention to spots and stains is required to adequately maintain the rugs and carpets. The amount and frequency of cleaning is determined by the color, texture, design, amount and type of traffic it receives. Vacuum sweepers are designed with a straight suction, and strong suction with revolving agitator brush. The straight suction removes the surface dirt, and the revolving agitator brush with strong

suction is very effective for the removal of imbedded dirt. The brush type sweeper, with revolving brushes, takes up only surface dirt, and does not get at imbedded soil, and is most helpful in brushing up matted pile.

(2) Routine cleaning of rugs and carpets should be accomplished as required with a vacuum cleaner.

(3) The other two methods used in rug cleaning are the dry and wet method, fig. 7.

(a) *The dry method is accomplished by the use of powder-type cleaners (solvent saturated or detergent saturated sawdust)*. The rug or carpet is first thoroughly cleaned with the vacuum cleaner. Then sprinkle the dry powder liberally over the area to be cleaned and brush it into the rug or carpet, then vacuum thoroughly. Although this method is not as effective as the wet method, it removes greasy dirt better. The additional advantage is the fact that no drying period is necessary. The wet method is best suited for carpets and rugs of man-made fibers, and this procedure requires certain precautions. Avoid the use of soap, ammonia, washing soda or strong household cleaners. It is essential for best results, that spots and stains be removed before they have a chance to dry or "set." There are several Carpet Stain Remover sets on the market that will remove almost every common stain such as ink, coffee, oil, grease, shoe polish, colas, wine, liquor, grass, etc. These kits are a helpful tool in carpet maintenance. Before attempting removal, it is essential the spot or stain has been correctly identified. If the spot or stain cannot be identified the following procedure may be followed:

1. Remove excess material with a blunt instrument; remove liquids with clean white absorbent material.

2. Apply a detergent-vinegar-water solution made with one teaspoon of neutral detergent to one teaspoon of acetic acid mixed with one quart of warm water. Blot with clean, white cloth gently from soiled edge to center.

3. Dry the rug or carpet and brush pile gently to restore original texture. With any type of cleaning or stain removal



**Figure 7. Industrial Type Vacuum Cleaner.**

avoid getting rug or carpet too wet. Dry as quickly as possible. Direct air blast from a fan or vacuum attachment is helpful. Spots and stains of unknown origin that do not respond to treatment should be referred to a professional rug cleaner.

(b) *Wet cleaning method.* Cleaning or on-location shampooing of rug or carpets.

1. Cleaning or on-location shampooing of rugs or carpets to remove heavily imbedded dirt is a specialized process and requires thoroughly trained workmen. If such personnel are not available, excellent results can be obtained in a plant equipped to do such cleaning. On-location shampooing will not remove all dirt and soil. The average rug or carpet will require cleaning or shampooing approximately once each year for best appearance. After four to five years of on-location shampoos, a wall-to-wall carpet or rug should be taken up, thoroughly beaten to remove imbedded dirt, reinstalled and shampooed as indicated below; or cleaned in the plant of and by a qualified commercial estab-

lishment. The cost of on-location shampooing or in-plant cleaning by commercial establishments is approximately the same.

2. If on-location shampooing must be accomplished by custodial personnel in lieu of commercial in-plant cleaning or on-location contract shampooing, the following procedures should be used:

a. Note direction of the pile-lay on wool rugs or carpets.

b. Brush against pile-lay with a stiff deck brush to loosen soil and open pile tufts in preparation for shampooing.

c. Vacuum to thoroughly remove soil loosened by preparatory brushing.

d. Spot for ink, oil and other stains.

e. Use concentrated detergent, especially manufactured for rug shampooing. Mix with water in accordance with manufacturer's recommendations. Six quarts of the solution will cover approximately 100 square feet of rug area. Use disk type floor machine

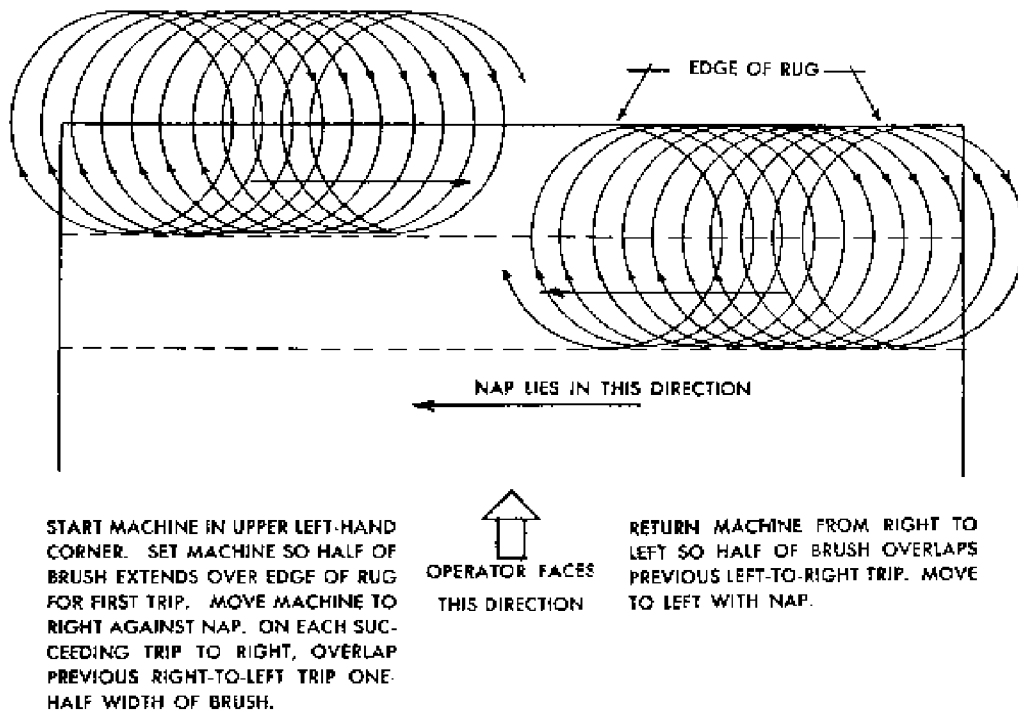


Figure 8. Rug Shampooing Diagram.

equipped with solution tank and nylon bristle brush. Operate machine in a circular motion in an area three to four feet square, using broad overlapping strokes, and feeding only enough solution to work into the rug pile, fig. 8. Avoid wetting the rug backing. Repeat this process until the entire rug is cleaned. Corners, stairs and areas under fixed equipment, etc. may be shampooed with a hand brush. Particular care must be taken to use only enough solution to clean carpets or rugs. Excess moisture may cause shrinkage or foster the growth of fungi such as mildew.

*f.* Use industrial vacuum cleaner to pick up as much of the suds and dirt in solution as possible.

*g.* Cotton pile rugs, because of their tendency to flatten, should be shampooed, followed by deck brushing to erect the matted pile and shampooed again to effectively clean all sides of the pile tufts.

*h.* After the entire rug is shampooed and vacuumed, erect the pile tufts by brushing with the pile-lay, as noted in 3.a above, with a clean deck brush. The workman's shoes should be clean to avoid soiling the cleaned rug.

*i.* If necessary to remove fluff and lint dislodged by the post-shampoo brushing, use vacuum cleaner in one direction only.

*j.* Place aluminum disks under all legs of furniture and other equipment until the rug is dry to avoid staining from rust or dye. Stiff heavy neutral color or white paper-board is also useful for this purpose.

*k.* Allow rug to dry thoroughly before using. Drying may be speeded by opening windows or using fans.

*l.* A properly cleaned rug should be free of streaks, stains and spots and should have a bright uniform color.

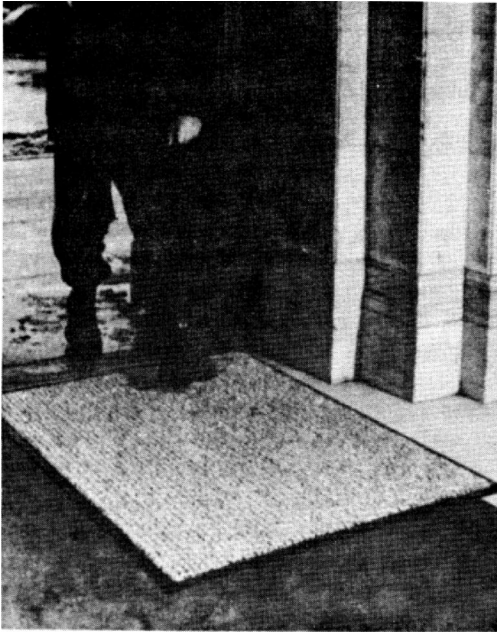
**3.1.9 Snow and Ice Removal.** Snow and ice removal is gradually becoming a less tedious and back breaking job with the development of new equipment and chemicals. Icy sidewalks and entrance ways are not only a maintenance problem, but also a severe

safety hazard. Ice, snow, and slush on sidewalks and entrance ways contribute to increased maintenance problems with interior floors, finishes and floor coverings within the building. These maintenance and safety factors dictate that the prompt removal of ice, snow and slush be accomplished as soon as possible on all walks and entrance ways. When this task is assigned to custodial personnel, snow and ice should be removed by them from steps, landings, and entrance walk from sidewalk to buildings. When practical, this work should be done prior to arrival of personnel, before noon hour, and before termination of work. The problem of ice removal will sometimes require the use of chemicals. The addition of various types of ice removers adds further to the interior maintenance problem. The use of sand and cinders present an abrasive problem: the chemicals present corrosive, toxic and deleterious effects on all types of flooring especially carpeting. There is the problem of deciding which type of ice melter to use: rock salt, calcium chloride or the prepared melters. Abrasives used depends on availability



**Figure 9a. Before—Use of Entrance Mat.**





**Figure 9b. After—Use of Entrance Mat.**

and comparative cost. Rock salt is the cheapest and probably one of the best for use on steps and sidewalks. Calcium chloride costs about twice as much as rock salt and is very difficult to store unless it is kept under moisture-proof conditions. Calcium chloride is effective at much lower temperatures than rock salt and is much faster in reacting to ice than rock salt. In the use of chemicals, aside from the cost, there is also the problem of possible damage to the interior floors and floor coverings. The ideal remover is one that will not track into the building and damage floor finishes and covering, and will also not have any deteriorative effect on the grassed areas. The important thing to remember about all these melting chemicals is to instruct the employees to wear gloves, and keep away from the skin and eyes. If irritation of the skin or eyes develops, the employee should immediately flush the affected parts with large amounts of clean water and then report to the first aid facility for treatment. Floor mats should be placed in foyers and entrances to remove snow and dirt from shoes. Mats and surfaces underneath should be cleaned at least daily and more frequently

if necessary to prevent tracking of snow and dirt into buildings, fig. 9a and 9b.

### **3.1.10 Washing Walls and Woodwork:**

(1) *General.* Proper washing of walls and woodwork reduces painting frequency. Walls may be washed many times and still remain in excellent condition. If there is doubt whether walls may be washed successfully, test a small area that is not likely to be noticed.

#### *(2) Washing Walls by Hand:*

(a) *General.* Wherever possible, it is recommended that wall washing be performed by two men properly trained to do the work.

(b) *Equipment.* In small rooms, workmen should use safety-type ladders to wash ceilings and high areas. In large areas, more progress can be made if planks 12 to 16 feet long are placed on safety scaffolds. Planks should be placed at the most efficient working height. Before use, scaffolds and planks should be examined for safety. Workers should use caution in handling planks and scaffolds to avoid damage to walls or fixtures.

(c) *Cleaning materials.* Cleaning materials consist of the following:

1. All-purpose synthetic detergent.
2. A large sponge or clean cloth for washing, another for rinsing, and a soft, clean cloth for drying.
3. 14-quart buckets for washing solution and rinse water.

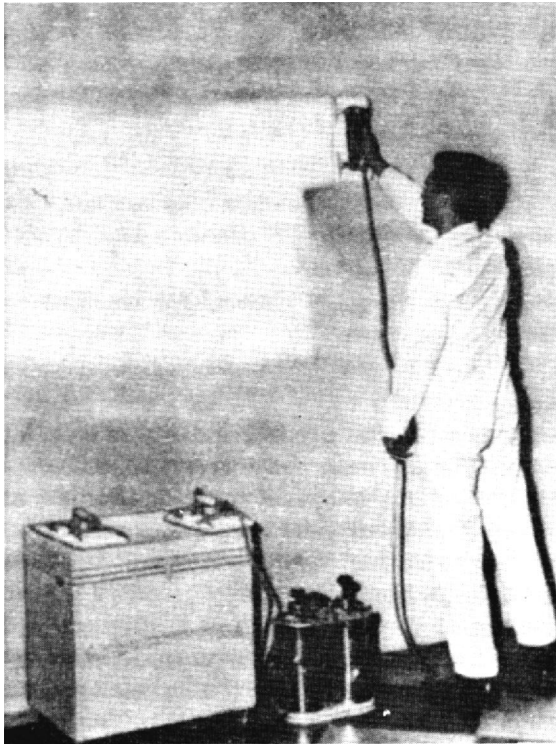
(d) *Wall Washing Procedure.* Test solution on walls to be cleaned. Use a solution only as strong as necessary. Change cleaning solution and rinse water frequently. Do not use trisodium phosphate or alkali soaps on painted surfaces. Work should proceed from corner to corner without stopping to eliminate formation of lap marks caused by the drying of dirt and washing solution. Lower half of wall should be washed first to prevent streaking which results when dirty water runs down. Use straight, up and down strokes for speed and a more even effect. Full details of wall washing procedure are found in paragraphs 6.2.25 to 6.2.27 incl.

(3) *Washing Walls with machine.* Only trained personnel should use a wall washing machine. The use of this machine greatly increases production. Proceed in the same manner as washing by hand. Full details are contained in paragraph 6.2.25 Wall Washing—Hand Method, and paragraph 6.2.27 Wall Washing—Machine Method. Figure 10 shows wall washing machine in operation.

(4) *Wall Washing Standards.* Streaks and lap marks should not be left on the wall. Corners, other areas difficult to reach, and woodwork should be clean. The wall should not be bleached from use of too strong a washing solution. Water should not be permitted to run on floor or fixtures. Pictures, furniture, and other fixtures moved should be replaced.

(5) *Types of Wall Materials and Finishes:*

(a) *Unpainted Plaster Walls.* Unpainted plaster walls cannot be washed be-



**Figure 10. Wall Washing Machine.**

cause they are porous. They may be dusted with a soft bristle brush or vacuum cleaned with a soft brush. Walls should not be dusted in damp weather.

(b) *Walls Painted with Water Paints.* Walls painted with kalsomine or whitewash are porous and cannot be washed. Modern types of water paints are usually washable. Do not wash older varieties of water paint unless surface is to be repainted. Although walls painted with casein paint are waterproof, cleaning with wallpaper cleaners is recommended.

(c) *Oil Painted or Enameled Walls* These walls may be washed with all-purpose synthetic detergent solution without damage.

(d) *Glass, Vitreous-China and Glazed Tile Walls.* Walls of these types may be washed with any neutral cleaning solution. Strong cleaners may cause crumbling of cement of mortar joints. Scouring powders or abrasives should not be used.

(e) *Marble, Granite, Onyx, and Other Natural Stone Wainscoting.* Wash with synthetic detergent, rinse with clear water, and dry with clean cloth. Never allow an oily duster to touch these materials. Oil stains marble and other light colored stone.

(f) *Acoustically Treated Walls.* These walls may be washed by machine only if extreme care is taken. A vacuum cleaner should be used to remove dirt from holes before washing. If cleaning solution enters small holes, the surface may warp or buckle. Walls should be cleaned by working a small area at a time. Follow with rinsing and drying towels as quickly as possible. If walls are to be cleaned by hand, use a stiff palmetto brush. Start at or on ceiling and work downward. Care should be taken to avoid scuffing, which will create an uneven surface.

(g) *Fiberboard Wall Material.* Most fiberboard wallboards are porous and absorb water. They cannot be washed unless painted. Care must be taken in washing to prevent water seeping into the seams which will cause swelling and discoloration.

(h) *Oil and Latex Base Painted Gypsum Board.* If surface is unscarred, walls may be washed with all-purpose synthetic de-

tergent solution. If water is allowed to seep between seams, discoloration will occur, and if repeated, will cause deterioration.

**3.1.11 Dusting.** Dusting should be done with a treated cloth or yarn duster. Dusting with brush or feather duster is not recommended as it only spreads more dust. Cloths should be shaken into dustbox to remove loose dust. When soiled, they should be washed and treated as described in (paragraphs 6.2.1 and 6.2.2).

**3.1.11.1 High Dusting.** High dusting includes areas over windows and doors, overhead pipes, ceilings, and walls. High dusting should be performed before floors are cleaned and before low dusting is undertaken. An industrial or domestic vacuum cleaner, with long tube and soft bristle brush, should be used to remove dirt from walls, ceilings, and over doors and windows. If hand methods are used, heavy dust accumulation over doors, windows, moldings, and top of pipes is removed with a counter brush by sweeping it into a dustpan. Finish dusting these surfaces with a yarn duster. Walls and ceilings may be brushed with a clean floor brush. Ceiling should be swept first. Clean walls by starting at ceiling, sweeping downward in one stroke. A more thorough but longer method is to cover brush with clean cloth and wipe ceiling and walls. Full details of high dusting procedure are found in paragraph 6.2.28. Curtains and draperies may be removed and cleaned, or vacuumed in place, fig. 11.

**3.1.11.2 Low Dusting.** Low dusting includes all places easily reached when standing on the floor or approximately 6 feet high. It should be performed after floors have been swept and dust has settled. Dust-cloth should be moved lightly over surface. Hard rubbing may leave oily streaks. Do not allow treated dustcloth to touch walls. It will leave a dark spot which cannot be removed from plastered, casein-painted, or kalsomined walls. Custodial services personnel do not dust typewriters, adding machines, and similar equipment. Paragraphs 6.2.29 and 6.2.30 give full details of dusting procedures.

**3.1.11.3 Dusting Standards.** Surfaces should not have dust on them. There should be no oily streaks on surfaces or stains on



**Figure 11. Automatic Battery Powered Floor and Wall Dusting Machine.**

walls from contact with oily dusters. There should be no oily film left on glass in cabinets or pictures. Dust should be removed, not scattered around the room. Table 1, page 4, gives a suggested schedule for dusting.

## **Section 2 — USE AND CARE OF EQUIPMENT**

**3.2.1 General.** The purpose of this section is to explain the operation of custodial services equipment to enable personnel to use it efficiently, and avoid abuses which necessitate repairs and lead to eventual failure. Repair of equipment is not normally accomplished by custodial service personnel.

**3.2.2 Equipment Needs.** Equipment needs vary from installation to installation. They must be determined in each case. Equipment listed in Chart 2 will cover most conditions. Further consideration should be given to items needing frequent replacement. There

should be sufficient supplies available at all times to insure continuous, efficient, custodial services. Labor costs are several times that of supplies and equipment. In the interest of health, morale, and economy, the importance of using the most suitable supplies and equipment should not be overlooked. All installations should keep current on new developments and keep the equipment up-to-date.

**3.2.3 Floor Maintenance Equipment.** One of the most important functions in the care of floor maintenance equipment is the lubrication of machines. A tag or stamped plate showing type and frequency of lubrication should be attached to each machine. Supervisor should keep manufacturer's lubrication instructions for each type of machine, and records showing last date of lubrication. Frequency and method of lubrication must meet the requirements of these instructions. The Navy requires that each machine be identified by a tag or label which shows date of purchase, cost, and instruction, which cautions the operator to handle with care and provides proper maintenance.

**3.2.3.1 Battery Powered Scrubbing Machine:** Fig. 12. (1) *General.* This is a battery powered, motor driven, all purpose floor maintenance machine. This machine meters the scrubbing solution to the floor, scrubs thoroughly, picks up dirty solution and dries

in one operation.

(2) *Attachments*—By changing brushes or pads, squeegee blade and inserting filter bag in vacuum element, the machine can be used for buffing operations and dry vacuum. Other attachments include: hose assembly, wand assembly, floor and wall tool assembly.

(3) *Handling Machine.* The following rules should be adhered to in handling the Battery Powered Scrubbing Machine:

(a) Sweep floor thoroughly before scrubbing.

(b) Remove charger plug and close battery cover.

(c) Be sure dirty water tank is drained and clean. Check cleanout door and drain valve and tighten if necessary for a good seal. An open drain valve will cause poor water pickup.

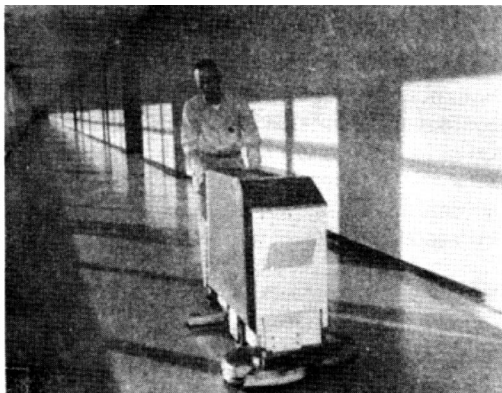
(d) Two forms of scrubbing are commonly used; single and double scrubbing.

1. Single scrubbing operation is one using the brushes and the squeegee pick-up together leaving the floor dry in one coverage, fig. 13.

2. Double scrubbing operation uses only the brushes, leaving the solution on the floor then returning for a single scrub using brushes and squeegee pick-up. Do not allow solution to dry before making second scrub.

(4) *Use of Equipment and Accessories:*

(a) *Lambswool Pad.* A lambswool or synthetic wool pad with elastic or draw



**Figure 12. 30" Automatic Battery Powered Scrubbing Machine.**



**Figure 13. 30" Automatic Battery Powered Dry Pickup Machine.**

string cover that fits over brush block. The lambswool pad is used to remove brush swirl marks and where a high luster is desired.

(b) *Steelwool Pad.* Steelwool pads come in various sizes and grades ranging from fine to course. The fine pads No. 00 are used for polishing and course pads No. 3 are used for scrubbing or dry cleaning floors.

(c) *Synthetic Pads.* These pads are of woven nylon or other synthetic material, impregnated with an abrasive, used to polish or scrub floors, and come in various grades from fine to course. Some pads are equipped with a special holder and others are held in place by the weight of the brush. These pads are advantageous in that they can be washed and reused, and are more economical and effective than brushes. These pads are used in the spray cleaning process.

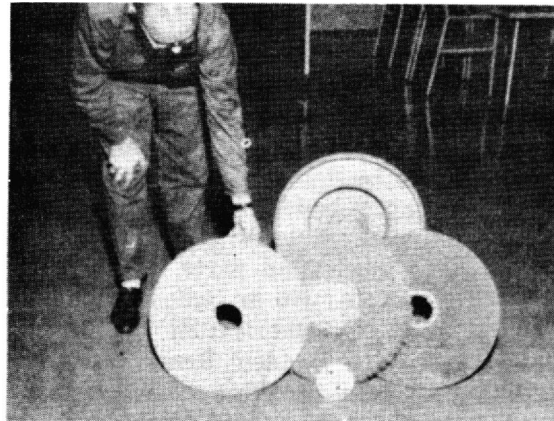
#### 3.2.3.2. *Disk-Type Machine:*

(1) *General.* This is a concentrated weight, motor driven brush machine. When in use, the entire weight of the machine is carried on the brush. The weight of the machine increases the effectiveness of polishing. It is equipped with wheels or casters which are used only to move machine from one job to the next. Essential parts consist of the frame or housing, power unit, driven assembly, handle, and attachments. (fig. 3.) This machine is more practical for congested areas than the larger machines.

(2) *Attachments.* Brush consists of cast aluminum or laminated wood disk to which fibers are attached, fig. 14. Attachments are connected to drive shaft by cast iron or pressed steel collar with lugs. The machine should be turned on its side while attachments are being installed. Make certain brush has been turned on as far as possible before motor is started.

*Note:* Never install brush by running machine over it, and allowing it to lock by running motor.

Steel wool disks are used for dry cleaning. Palmetto bassine or synthetic pads for scrubbing, and tampico brush and synthetic pads are used for polishing. Handle is used to guide machine, tilt it back on casters for maneuvering. Handle can usually be adjusted to suit operator.



**Figure 14. Attachments for Battery Powered Floor Machine.**

(3) *Size of Disk-Type Machine.* Machines are available in 9 to 22-inch bursh diameters. The 12-inch size for small or congested areas, the 15-inch size for general use, or the 18-inch for large open areas, are best suited for Department of Defense installations.

(4) *Cleaning Machine.* Wipe dust, wax, etc., from machine immediately after use. Wipe extension cord before winding cord on handle.

(5) *Handling machine.* (paragraph 6.2.22.)

*Note:* When using disk-type machine, do not tilt more than required for maneuvering. Excessive tilting causes undue strain on brush, gears, and motor.

(6) *Use of Machine.* Disk-type machine is used to clean, burnish, or polish floor surfaces. By use of water tank attachment, it may be used to shampoo rugs.

#### 3.2.3.3 *Vacuum Cleaners.*

(1) Two types of vacuum cleaners are at the disposal of custodial services personnel, the domestic and industrial type. Household-type machines create a high vacuum, but the air intake is small. Industrial machine (fig. 7) has a blower vacuum, but air intake is much greater, which increases cleaning capacity. In general, use of industrial vacuum is recommended in preference to household-type. Household-type machines

are used to best advantage where items to be cleaned are small, few, or widely scattered.

(2) *Care of Vacuum Cleaners.* Store machines and equipment in a clean, dry room. Keep attachments clean and stored where they will not be damaged. Empty bags or dust collecting receptacles daily. Wipe machine with cloth at least once a week. If motors have lubrication parts, add two or three drops of SAE 10 or light machine oil once a week. Overlubrication of electric motors should be avoided. Remove strings, hair, or dust from brush or vacuum attachment daily. Carry household machines from one room to another or one building to another. Wind cord loosely on hooks provided. Tight winding damages cord. Avoid running over electrical cord, and pulling cord from wall attachment except by the plug. Avoid bumping into walls, radiators, furniture, and other objects with machine or attachments.

(3) *Use.* Vacuum cleaners are used to clean rugs, draperies, walls, pipes, radiators, and convectors, and for water pickup operations.

#### 3.2.3.4. *Floor brushes:*

(1) *Construction.* Floor brushes are constructed in two units; the hardwood handle, and the head consisting of wooden block and fibers. The handle has one end threaded to screw into the block. The head is a hardwood block from 18 to 36 inches long. Two threaded holes are bored in block to permit reversing handle as fibers bend from sweeping too much in one direction. Fibers may be hog hair, horsehair, or one of a number of plant fibers, such as palmetto, tampico, raffia, or arenga. Tufts should extend at least three and a half to four inches from block. Handle is usually too long for practical use. Set brush on floor with handle upright. Mark handle at point even with worker's eyebrow. Cut, round the end, and smooth with sandpaper.

(2) *Care of Floor Brushes.* Clean floor brushes with nail brush as required. Wash oily or very dirty brushes in warm all-purpose synthetic detergent solution. Shake out as much water as possible and hang to dry

with bristles as straight as possible. Do not use until brushes are thoroughly dry. Hang brushes by handle in a clean, dry place when not in use. Do not let bristles touch wall or floor. A one quarter-inch hole bored in handle two inches from end makes it possible to hang brushes on a 12 penny finishing nail. Do not knock brushes against wall to clean them. This splits end of block and loosens tufts. Brush handles should be changed to other hole in brush head at least once a week to keep them in best working condition.

(3) *Use of Floor Brushes.* (table 4)

#### 3.2.3.5 *Corn Brooms:*

(1) *Construction.* Corn brooms are made from stems of broom corn plant. Stems or straws are attached to handle by winding wire around them. They are then stitched to make broom flat and keep straws from spreading. Straws are trimmed at bottom. Good brooms should weigh at least 32 pounds per dozen.

(2) *Care of Corn Brooms.* Always store brooms where there is a free circulation of air. Bore hole in handle in same manner as floor brushes in order to hang them. Never store brooms by standing on straws. Clean brooms by washing in all-purpose synthetic detergent solution, rinse with clear water, and hang to dry with straws down. Do not use wet corn brooms. Do not use corn brooms for scrubbing. Both operations weaken straws and brooms lose shape.

(3) *Use of Corn Brooms.* (table 4)

3.2.3.6 *Sweeping Mops.* Sweeping mops are made from cotton yarn. Straight mops have yarn stitched to a cotton mitten which may then be slipped over wire or wooden mop-head. The V-type mop has 10-inch, canvas-backed sections which fit into the mophead itself. The V-type mop may, by opening or closing handles, extend from 6 to 57 inches wide. Both mops are easily removed from frame for washing purposes. Quality of mops depends on length of yarn and density or thickness. Sweeping mops may be used dry or treated, fig. 15.

(1) *Care of Sweeping Mops.* When mops become badly soiled, remove from



**Figure 15. Treated Yarn Dust Mop, 60 inch.**

mophead and shake out as much dirt as possible. Place mops in solution of two teaspoons of trisodium phosphate to one gallon of warm water and let them remain overnight. Rinse thoroughly in clear water. Wring out as much water as possible without damaging mop, and hang to dry. Before using, fluff out strands by hand. Hang straight sweeping mops in same manner as floor brushes. Hang high enough to keep off floor. Store where there is a good circulation of air. Store V-type mops with mophead upwards where there is good air circulation. Do not let yarn touch wall.

(2) *Use of Dry Sweeping Mops.* (See table 4.)

(3) *Treated Sweeping Mops.* These mops are the same as dry sweeping mops except they are treated to collect more dust. Mops should be treated with a solution of liquid mop treating compound.

(a) Dip the mophead into the solution until it is completely submerged. Agitate it so that all the strands absorb the solution.

(b) Remove the mophead from the solution and using a mop wringer, wring it out as thoroughly as possible. The mophead may be wrung out in the bucket containing the solution or in a separate bucket. If a separate bucket is used, the extracted

solution should be poured back into the solution bucket to be reused.

(c) After the mophead has been thoroughly wrung out, it should be hung up in a well ventilated area and permitted to dry out overnight. After this drying out period, the mophead will be ready for use.

(d) In use, if mops or cloths do not become too dirty, they may be re-treated. However, when too dirty, they can be washed out easily with soap and water, allowed to dry, and retreated as above.

(4) *Care of Treated Sweeping Mops:*

(a) Dust-mops should be treated at the end of each working shift by spraying 1 ounce of dust-mop treatment to 4" to 6" of dust-mop length.

(b) Mops should be stored in a clean, dry area. Hang the mop so that it does not touch the walls and equipment and will not be brushed against by personnel. Mops should be hung with the mop heads down.

(c) Keep the tie cords in proper repair and in place.

(d) Do not allow the strands to become knotted or matted. Keep the strands free from splinter, metal particles, and keep them combed regularly.

(e) When shaking out a mop, do not strike the handle or any part of the mop against a hard surface. Such action might damage the frame and weaken the handle.

(5) *Use of Treated Sweeping Mops.*

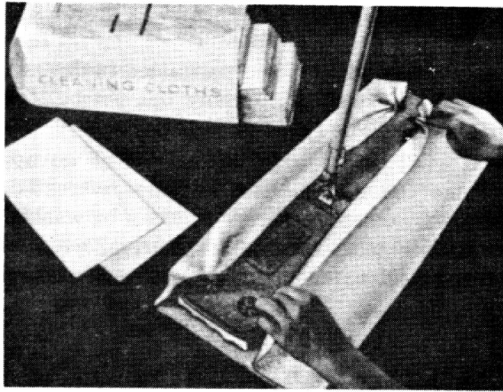
(a) Do not use a dust mop on wet or oily floors.

(b) While mopping, keep the back as straight as possible and lean slightly forward at the hips. Do not over-reach. Following these rules of work posture will reduce fatigue and prevent strain.

(c) Do not lift the mop from the floor unnecessarily; some of the gathered soil may drop from it.

(d) Do not bear down on the mop; pressure is not necessary to proper mopping action.

(e) If a vacuum is available, utilize it to remove loose soil from the mop. If no vacuum is available, the mop head should be frequently shaken into a large waste recep-



**Figure 16. Swivel Sweeping Tool and Reversible Cleaning Cloth.**

tacle or a dust box to remove and collect loose surface soil.

(f) By use of swivel duster with chemically treated cloths, dust can be picked up. These treated cloths are reversible throw-away type, fig. 16.

#### 3.2.3.7 Counter Brushes:

(1) *Construction.* Counter brushes are made in the same manner as floor brushes except the handle is a shaped extension of the wooden head.

(2) *Care of Counter Brushes.* Comb out bristles occasionally. When brushes become soiled, wash in lukewarm all-purpose synthetic detergent solution and rinse in clear water. Shake out as much water as possible. Brushes should be dried with bristles down. To do this, extend brush over edge of bench or table and place weight on handle. To prevent loosening of tufts, brushes should be kept dry except when being cleaned. When not in use, hang by handle so bristles are free.

(3) *Use of Counter Brush.* Use brushes to gather sweepings into dustpan, to clean corners, behind pipes, and under radiators.

#### 3.2.3.8 Radiator Brushes:

(1) *Construction.* Good radiator brushes are made of hardwood thin enough to allow

cleaning the narrow spaces between radiator columns. Brushes consist of tufts of bristles or horsehair about three inches long.

(2) *Care of Radiator Brushes.* Comb bristles with nail brush occasionally. When storing, lay brush on flat surfaces so tufts will be fiat and straight. Do *not* wet brushes. Use brushes to clean radiators only.

(3) *Use of Radiator Brush.* Run brush through radiator openings, first from end to end, and then through side openings.

#### 3.2.3.9 Damp Mops:

(1) *Construction.* Damp mops are made of cotton or linen yarn. Linen is preferable because it is stronger and wears longer. Each strand should be 8-ply yarn with breaking strength of not less than 70 pounds. There should be 135 strands stitched together at center by a three quarter to one and a half inch tape. Mops should be from 6 to 6½ inches wide, and from 35 to 37 inches long. A dozen mops should weigh not less than 15 pounds.

##### (2) *Care of Damp Mops:*

(a) Always rinse a mop carefully after use and squeeze it dry.

(b) Mop should be stored in a warm dry area where air circulates freely.

(c) A mop in storage should be hung with the yarn away from the wall, strands down.

(d) Do not let damp mops touch each other, other equipment, or come in contact with walls.

(e) If mop strands become loosened, they should be removed or cut off with scissors in order to prevent snagging and splattering.

(f) In addition to rinsing the mop whenever the mopping water is changed, the mop should be carefully washed periodically—(daily if possible).

##### (3) *Use of Damp Mops:*

(a) The basic purposes of the damp mop is to transfer liquid to and from floors.

(b) Soak a new mop in warm water for at least 20 minutes before use, in order to remove excess oils and expel entrapped air, providing better absorbency.



(c) Change mopping water frequently while mopping to prevent the water from becoming overly dirty. Rinse the mop each time the water is changed. Dirty water will cause a re-deposit of soil during mopping, leaving soil streaks.

(d) While mopping, the mop should stay on the floor, and should not be tossed through the air.

(e) The mop should be turned from one side to the other frequently while in use in order to expose more clean, moist strands.

(f) Wherever possible the use of mop squeezers are recommended over roll-type wringers. The squeezer is more efficient in the removal of moisture from the mop and is far less destructive to the mop. Mops should be squeezed or pressed carefully to remove water; twisting the mop will tear or weaken the strands.

(g) Mops can be used for scrubbing small areas and spots by folding the mop over on itself so that the tips of the strands are in direct contact with the floor, under pressure. Never scrub with the part of the mop closest to the holder because this will tear the strands.

(h) Avoid the use of mops with lye, caustics, or strong undiluted cleaning solutions because these materials attack the mop strand.

(i) It is not economical to continue to use worn-out mops—they should be discarded.

#### 3.2.3.10 Mop Buckets:

(1) *Construction.* Mop buckets are generally made of galvanized sheet iron or iron dipped in molten zinc after forming. The latter method is preferable because seams are sealed in the process. It is recommended buckets be fitted with wheels or casters so they can be moved easily. Buckets equipped with a gear-type mop squeezer are more satisfactory than those with an ordinary wringer. Oval-shaped buckets provide more space than round ones for dipping mop when wringer is attached. Buckets should have strong handle and a three-quarter to one-inch rim on bottom to permit easy emptying.

Buckets should have capacity of 28 to 44 quarts.

(2) *Care of Mop Buckets.* Avoid rough handling that will dent buckets or open seams. After use, rinse and dry to prevent rust. Wipe outside with damp cloth to remove dirt and accumulated soap.

(3) *Use of Mop Buckets.* Mop buckets are used to hold water for mopping, and to hold water emulsion wax if it is to be applied with a mop.

#### 3.2.3.11 Mop Trucks:

(1) *Construction.* Mop trucks usually consist of two-compartment tanks mounted on metal frames with attached wheels or casters. Tanks are made of galvanized iron, one for soap solution, one for rinse water. Soap solution tank has wringer attached. Both tanks have drain spigots and have a 28-gallon capacity each.

(2) *Care of Mop Trucks.* Avoid rough handling that may dent tanks or open seams. After use, rinse out with clear water and dry with cloth to prevent rust. Remove dirt and collected soap from outside with damp cloth. Always leave wringer in released position. Oil wringer and casters twice a week.

(3) *Use of Mop Trucks.* Mop trucks are used in all large mopping operations. Use of mop buckets in these instances would mean changing water more often.

#### 3.2.3.12 Dustboxes:

(1) *Construction.* Dustboxes may be made in the engineer shop. They are long, narrow boxes made of 20-gage galvanized sheet iron and have a wooden carrying handle. There should be a removable screen about four inches from bottom of box. This prevents sweeping mop from coming in contact with dirt already collected in box. Screen is removed when emptying box.

(2) *Care of Dust box.* Empty box in waste can when necessary. Avoid rough handling which may bend box.

(3) *Use of Dustbox.* Dustbox is used as a container to receive dirt from sweeping mop. It should be placed where it may be reached easily as sweeping proceeds. It is

also used as a container to receive dirt from dustpans.

#### 3.2.3.13 Wax and Floor Seal Applicators:

(1) *Construction.* Applicator consists of a wooden block over which lambskin is stretched, and a second block with handle attached. The blocks are held together with two small bolts equipped with wing nuts. Pressure of two blocks held by wing nuts clamps lambskin and holds it in place.

(2) *Care of Applicator.* After use, remove lambskin and wash thoroughly in lukewarm all-purpose synthetic detergent solution. Rinse carefully and lay on a flat surface to dry. Do not put lambskin in hot water. Heat or hot water will cause shrinkage or hardening of lambskin. If lambskin has been used in applying floor seal, wash in solvent before using all-purpose synthetic detergent solution, then wash and rinse. If skins are to be stored for a period of time, place them in container with tight fitting lid and add several moth balls.

(3) *Use of Applicator.* Applicator is used to apply water emulsion wax and floor seal. It is recommended for use when waxing small areas. On large areas this process may be performed more efficiently and economically with a mop.

#### 3.2.3.14 Nail Brush:

(1) *Construction.* Nail brush consists of a one by one inch piece of hardwood ten inches long, or broom handle same length with ten-penny common nails driven through holes three-quarters of an inch apart.

(2) *Use of Nail Brush.* Use nail brush to comb matted hair and embedded dirt from floor brushes, sweeping mops, and counter brushes.

3.2.3.15 *Putty Knife.* Each employee should carry a putty knife with a 1 1/4 inch blade. It is to be used for removing gum and other sticky substances from floors.

#### 3.2.4 Wall Washing Equipment:

(1) *Wall Washing Machine.* Machine usually consists of two tanks, one to contain chemicals, the other rinse water. Two trowels with extension hoses are attached to



Figure 17. Adjustable Safety Platform Ladder.

the tanks. Air pressure forces liquid through hoses to trowels. The third trowel on some machines is used as dryer. Trowels are made of non-corrosive metal. Trowels are covered by terrycloth pads folded to four thicknesses. Valves on trowel handles control flow of solution. Figure 10 illustrates the wall washing machine.

(2) *Care of Wall Washing Machine.* Manufacturer's instructions on care of the machine should be followed.

(3) *Use of Wall Washing Machine.* The machine may be used on any smooth wall which has been properly sealed and painted with water-resistant paint. Use of a heavy sponge, or a synthetic pad under the regular trowel pad to wash, stippled, swirl, sand finish, and painted brick surfaces. Machine may also be used to clean ceramic tile or stone walls, such as marble, granite, or quarry tile. Detailed description of wall washing procedure may be found in paragraph 6.2.27.

### 3.2.5 Miscellaneous Tools.

**3.2.5.1 Ladders.** The safety-type platform ladder or the aluminum bucket-type ladder should be used for wall, window, and light fixture cleaning as well as high dusting. Inspect ladders before use to insure that they are in safe condition. Instruct personnel how to use them safely. Figure 17 shows the safety-type ladder. Fiberglass should be used near electric wiring, because of the possibility of electric shock.

#### 3.2.5.2 Dusters:

(1) *Construction.* Dusters are made of cotton yarn held in a twisted wire. Low dusting requires use of duster with short wooden handle. For high dusting, handle should extend five to six feet. Twisted wire holding duster should be light enough to be bent to contour of pipe or other overhead surfaces.

(2) *Treating Dusters.* Dusters should be sprayed lightly with a dust mop treating compound 24 hours prior to using.

**3.2.5.8. Toilet Bowl Mops.** Toilet bowl mops are constructed of a wooden or plastic handle 12 inches to 18 inches long, to which acrilan or cotton strands are attached for use in cleaning and swabbing toilet bowls and urinals.

## Section 3—CLEANING WINDOWS

**3.3.1 Window Cleaning.** The principal purpose of window washing is to allow the maximum amount of light to enter the room. Washing for sake of appearance is of secondary importance. Prior to the cleaning of glass, the window sash should be brushed or wiped with a damp cloth.

**3.3.1.1.** Windows should be cleaned with a sponge dampened in clear water, and dried with a squeegee or window brush or sponge industrial wiping cloth. Squeegees reduce drying period of large windows. Where safety hooks are installed, a safety belt must be used when cleaning windows above the first floor. Use of a window pad is recommended because it absorbs spilled water, and protects sill against damage from worker's

shoes. Window washing equipment consists of safety belt, chamois, squeegee, sponge, and sill pad. Safety belt must be examined and in satisfactory condition before being worn. No worker is allowed to repair these belts. Before using ladders, inspect them to insure that they are in safe condition. When washing windows, the following rules should be observed:

(1) Clean windows at time that will cause minimum interruption.

(2) Close doors and windows before opening the one to be washed.

(3) Do not pass from one window to another on outside of building.

(4) Replace furniture or articles moved in the process of cleaning.

(5) Before leaving room, replace window, window shades, or venetian blinds in original position. Full details of window washing procedures are found in paragraph 6.2.31.

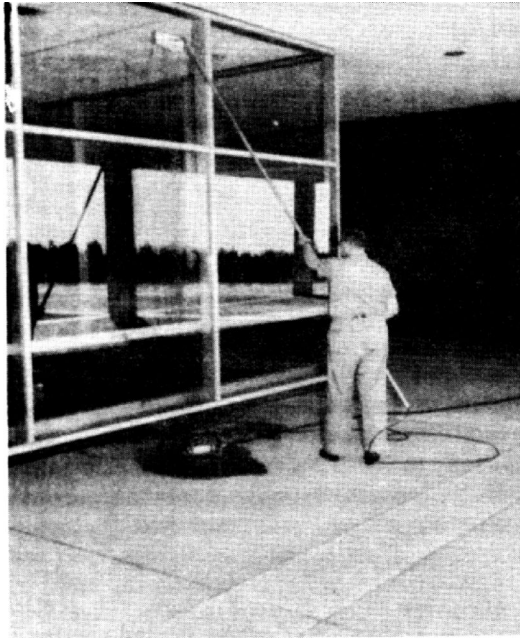
(6) Consideration should be given to the use of "Telescopic Window Washer" when scaffolding and other accessories are required. This is an efficient tool for manpower savings and safety, figs. 18 and 19.

**3.3.1.2 Window Cleaning Solutions.** Clear water should be used to clean windows. Change water frequently. If local conditions make windows difficult to clean, mix glass cleaner, detergent, and water as required. This solution cuts grease and leaves no deposit on glass. Ammonia should not be used. It dries out and loosens putty. Soap-grit cake is not suitable and leaves a white coating which is difficult to remove from sash. Take care to remove all the cleaning solution from adjacent painted surfaces.

**3.3.1.3 Frequency of Window Cleaning.** Frequency of window cleaning depends on season of the year, local climatic conditions, amount of industrial smoke in the air, and use of the building. Under average conditions, windows should not need cleaning more than two times yearly. Condensation on inside of glass in winter time may make it necessary to clean inside more often. Glass in



**Figure 18. Telescopic Window Washer.**



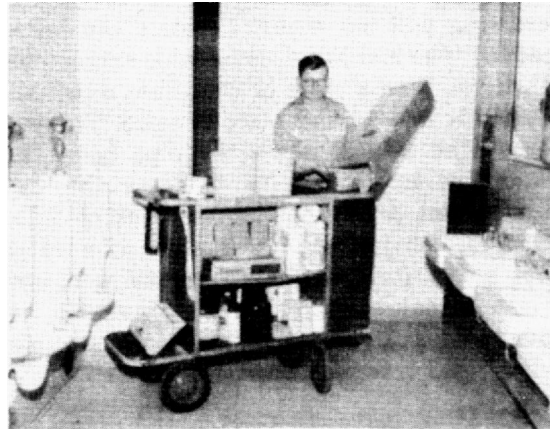
**Figure 19. Telescopic Window Washer with Detergent Tank.**

entrance doors and other places subject to hand marks should be wiped with a damp cloth often enough to keep them in presentable condition.

*3.3.1.4 Standards of Window Cleaning.* There should be no streaks or unwashed areas on glass. Water should not be spilled on sills, sash, floor, or furnishings. Shades and blinds should be readjusted. Occupants should not be disturbed.

#### **Section 4—TOILET ROOMS**

**3.4.1 Toilet Rooms.** A high standard of cleanliness should be maintained in toilet rooms. Toilet bowls, seats, urinals, washbowls, and other fixtures should be cleaned properly. For this reason, it is of utmost importance that adequate ventilation be maintained at all times. Room temperature should be kept as low as possible in summer, and not over 65 in winter. A warm room allows growth of bacteria, which is the source of many odors. Under normal conditions, daily cleaning



**Figure 20. Janitorial Service Cart.**

is unsatisfactory. If a toilet room receives a great deal of use, it may need cleaning more often. Figure 20 illustrates a type of cart that can be used for toilet room supplies.

*3.4.1.1. Toilet Bowl and Seat.* Wash bowl inside and out with all-purpose synthetic detergent solution. If water is hard and deposits are difficult to remove, use one tablespoon of trisodium phosphate to one gallon of water. Care should be taken in the use of trisodium phosphate. It attacks porcelain or vitreous china. (paragraph 6.2.32.) Remove stains with a damp cloth and a detergent solution. Do not use toilet bowl cleaner, acids, or stronger alkalis because they damage surface glaze. Work toilet mop as far as possible into trap. Thoroughly wash rounded inside rim of bowl. Inspect rim with hand mirror to insure complete removal of deposits. Wash seat with all-purpose synthetic detergent solution. Wipe outside of bowl and seat with clean, damp cloth. Flush toilet to rinse inside of bowl. Wipe tank and cover with clean damp cloth. If toilet bowls are properly cleaned daily with detergents, stronger cleaners will not be necessary. A detailed description of this operation is in 6.2.32.

*3.4.1.2 Urinals.* Wash urinals in same manner as toilets. (paragraph 6.2.32.) The trap is the main source of odor in urinals. This is caused by urine salts crystallizing just above the water level on dry sides of trap. If

urinal is flushed frequently, crusting will not occur. Crystals can be removed if urinal has a detachable screen over the trap. Wad a piece of cloth into a ball and attach it to a strong piece of wire. The wad should be pushed down the pipe below the waterline or to the point where the trap turns. Put about one-half cupful of toilet bowl cleaner into the trap and fill with water. Let stand for one hour, remove wad, and rinse urinal thoroughly. If urinals do not flush properly, report immediately to supervisor (paragraph 6.2.32).

*3.4.1.3 Washbowls.* Grease and other dirt can be removed with all-purpose synthetic detergent solution. Remove stains and soiled spots with a damp cloth and a detergent solution, the hand-spray bottle can be utilized. Avoid use of acids or strong cleaners which will damage surface glaze. Clean chromium-plated hardware with clean, damp cloth. Do not use abrasive cleaner. Do not allow water to seep between back of fixture and wall. See that fixture edges are clean. A detailed description of this operation is found in 6.2.33.

*3.4.1.4 Toilet Room Floors.* Much of the odor from toilet rooms comes from floor. Urine soaks into almost every known type of flooring material except ceramic tile. Once soaked into floor, it is almost impossible to remove. Toilet room floors should be thoroughly mopped at least once a day to prevent odors. The area immediately around urinals should be well scrubbed. Use a cleaning solution of all-purpose synthetic detergent and warm water.

*3.4.1.5 Toilet Room Walls, Partitions, and Woodwork.* Accumulations of dirt on walls and partitions should be removed daily. Wainscoting, stall partitions, and woodwork should be spot cleaned daily and washed every 1 to 3 months, depending on the use of the toilet. Where surfaces are washable, walls and ceilings should be washed at least once a year. (paragraph 6.2.25 or 6.2.27.)

*3.4.1.6 Use of Disinfectants and Deodorants.* Proper cleaning and ventilation

eliminates the need for disinfectants and deodorants in toilet rooms. (paragraphs 2.2.6 and 2.2.7.)

*3.4.1.7 Care of Dispensers.* In the interest of sanitation, dispensers for individual soap and towels should be provided in washrooms. Paper towels, toilet paper, sanitary napkin and soap dispensers should be checked and refilled daily. Dispensers should have sufficient capacity to require filling only once a day. It is most important that they are not allowed to become empty. Substitution of materials may cause failure of equipment. A common example is clogging of toilets when paper towels are used for toilet paper. Dispensers should be wiped clean with a damp sponge each day. Clean soap dispenser nozzles, and check to make sure they operate properly.

*3.4.1.8 Used Towel Disposal.* Large metal waste cans with swinging tops are recommended. Emptying of waste is made easier if a bag large enough to fill the can is hung from the inside pegs. This avoids unnecessary handling of can. This container should be emptied each day. Wash the can with detergent and water once a month.

*3.4.1.9 Electric Hand and Face Dryers.* These should be wiped clean with a damp sponge daily, including accessible interiors of air intake and outlet.

*3.4.1.10 Toilet Room Standards:*

- (1) There should be no odors.
- (2) Toilet bowls, washbowls, and urinals should be clean and bright. Soap film should not remain on fixtures.
- (3) Dispensers should be filled and in working condition.
- (4) There should be no marks on walls or fixtures.
- (5) Floor, wainscoting, and partitions should be clean.
- (6) Room should be adequately ventilated. Temperature should be between 60 and 65°F in winter and as low as practicable in summer.
- (7) All metal fixtures and other hardware should be clean and bright.
- (8) Mirrors should be clean.

## Section 5—MISCELLANEOUS CLEANING

### 3.5.1 Miscellaneous Cleaning:

*3.5.1.1 Light Fixtures.* It is generally recognized that dirt absorbs and masks light. The progressive decrease of light caused by accumulation of dirt renders periodic cleaning of lighting equipment a necessity. The frequency of cleaning depends entirely upon local conditions. Airconditioned and air-filtered rooms may require fixture cleaning only once a year. In an atmosphere which is heavy with dust and fumes, cleaning every month may be necessary.

(1) *Light Meter Readings.* The cleaning schedule for a particular installation should be determined by light meter readings after the initial cleaning. When subsequent foot-candle readings have dropped 20 to 25 percent, the fixtures should be cleaned again. Readings should be made with the light meter at the working surface with the meter reader in the position of the operator or person using the working surface. In the case of fluorescent lighting, if cleaning does

not restore the correct lighting levels, the fluorescent tubes should be replaced. The light output of a fluorescent tube decreases with age.

(2) *Washing of Equipment.* Lighting equipment should be washed, not just wiped off with a dry cloth. Washing reclaims 5 to 10 percent more light than dry wiping, and reduces the possibility of marring or scratching the reflecting surfaces of the fixtures.

(3) *Removable Equipment.* Removable glassware, reflectors, and diffusing louvers should be cleaned as follows:

(a) Immerse in a solution of synthetic detergent cleaner, conforming to Federal Specification P-D-220. Scrub with a soft brush or sponge. When incrustation is not removed by scrubbing, use No. "0" steel wool or nylon cleaning pad to remove dirt film.

(b) Rinse in warm clear water and dry with a clean cloth. (Fig. 22.)

*CAUTION:* Do not immerse lamp base or electrical connections in the cleaning solution.

(4) *Fixed Equipment.* Glassware, reflectors, and diffusing louvers that cannot be removed should be cleaned as follows:

(a) Wipe with a moist cloth or sponge, using a solution of synthetic detergent cleaner, conforming to Federal Specification P-D-220. When incrustation is not removed by sponging, use a nylon cleansing pad or No. "0" steel wool to remove dirt film.



Figure 21. Lamp Changing Unit.

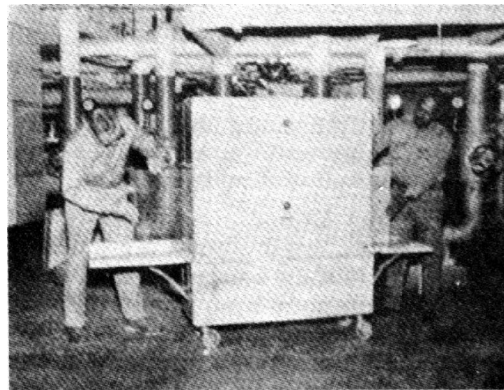


Figure 22. Light Diffuser Cleaning Machine.

(b) Wipe off excess moisture with a clean cloth. Clean outlets and stem hangers with a moist sponge or cloth dampened with synthetic detergent cleaner and wipe dry. Replace enameled, chrome, aluminum, or silver-plated reflecting surfaces that cannot be adequately cleaned and polished.

*3.5.1.2 Lamp Replacement.* Neglected lamp outages reduce illumination. (If burned-out lamps are not properly replaced, outages alone can cause illumination to drop to unsafe foot-candle levels in a short time.) In some cases, it may be satisfactory and more economical to clean lamp surfaces and fixture interiors only when relamping. Each activity must determine whether electrical or janitorial service personnel do the cleaning. (Fig. 21.)

(1) *Individual Method.* Lamp replacement is the responsibility of the custodial section in areas where custodial services are provided. To prevent reduced illumination from lamp outages:

(a) Instruct employees to report burn-outs as they occur.

(b) Replace blackened or discolored lamps even though they are still burning. Discoloration indicates the lamp is nearing the end of its useful life.

(c) Replace the lamps as they begin to flicker. A burned-out lamp in a live circuit may cause damage to starter and ballast. Blackening at the ends of the tube adjacent to the base indicates that the lamp is near the end of its useful life.

(d) In general, replace with the same type, wattage and voltage as that of the lamp removed. If frequent burn-outs occur, voltage rating of lamps may be too low. Lamps of higher wattage than called for on lighting design plans should not be used.

(2) *Group Method.* Group replacement of lamps before they burn out is considered the most effective and economical method for relamping large and/or hard to reach areas such as hangars, drill halls, auditoriums, and shops. Whenever possible, group replacement should be accomplished simultaneously with fixture cleaning, thus, reducing overall labor cost, causing

minimum interference with production, and producing a higher and more uniform level of illumination. To replace lamps by this method install new lamps in all fixtures in the prescribed area. After these lamps have been in use 75 to 80 percent of their rated life, they all should be replaced and the cycle repeated. Lamps thus removed should not be reused since their light output and expected life are greatly reduced.

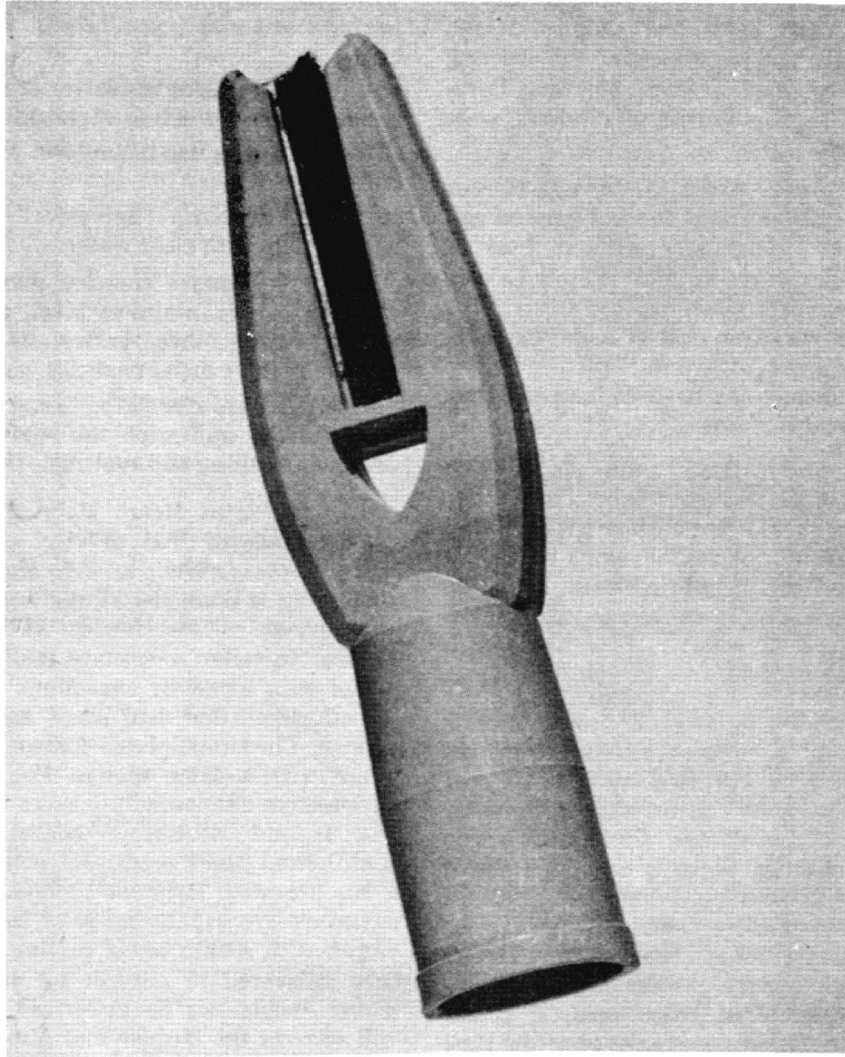
*3.5.1.3 Drinking Fountains.* Wash daily all enameled fountain bowl with all-purpose synthetic detergent solution daily. Wipe remainder of fountain with clean, damp sponge. Wipe chrome fittings with clean, damp sponge. Do not use metal polish on fittings. Detailed information is given in paragraph 6.2.34.

*3.5.1.4 Furniture.* Furniture should be washed with a lukewarm all-purpose synthetic detergent solution applied with a lightly damp cloth. Dry furniture with a clean, dry cloth as quickly as possible. Use a minimum of water on wood furniture. Excess water causes grain to swell, which will loosen finish and cause rough spots. It may also loosen glue in the joints.

*3.5.1.5 Window Shades.* If shades are washable, place on large sheet of paper on floor. Wash with sponge dampened in all-purpose synthetic detergent solution. Rinse with sponge moistened in clear water and dry with clean cloth. Turn shade over and wash other side. Never rub hard enough to stretch cloth. Hang up to dry. When almost dry, roll shade tightly and let remain for several hours to eliminate wrinkles.

*3.5.1.6 Venetian Blinds.* Venetian blinds are generally painted with waterproof enamel and may be washed. Usually, they may be cleaned in place with a vacuum attachment (fig. 23) or by using a sponge dampened in all-purpose synthetic detergent solution. Turn slats flat, and clean one side. Wipe with a clean, soft cloth. Turn slats with opposite sides facing, and flat. Repeat process. Avoid getting straps wet. If slats are very dirty, and dirt is hard to remove, take blind down and wash each slat





**Figure 23. Venetian Blind Cleaning Attachment.**

separately. When facilities permit, blinds may be cleaned as a unit by dousing them in tub of lukewarm water and all-purpose synthetic detergent, rinsed in clear, lukewarm water and hung to dry. Such work is often accomplished by contract and should be closely inspected to insure maintenance of cleaning standards.

*3.5.1.7 Porcelain and Vitreous China.* Toilets, urinals, and many washbowls are made of porcelain or vitreous china. In both cases, the body is made of clay and glazed to make

the surface water-resistant and easier to clean. The glaze is attacked by acids, alkalies, lye, and trisodium phosphate. Continued use of scouring powders will remove glaze.

*3.5.1.8 Vitreous -Enameled Iron and Steel.* Some washbowls and drinking fountains are made of cast iron or steel with a protective coating of vitreous enamel. Enamel is not resistant to acids or alkalies and is attacked by strong soap. Scouring powders will wear away enamel.

*3.5.1.9 Glass.* Glass is nonabsorbent and resistant to most acids and alkalis. Harsh abrasives are not recommended for cleaning because they may scratch surface. Paragraph 6.2.31 gives details of cleaning glass and windows.

*3.5.1.10 Solid Metal.* Solid non-ferrous metal and stainless steel fixtures may be polished almost indefinitely without fear of wearing through metal. Most metals become dark or discolored when exposed to air. This tarnish is a very thin coat of metal oxide. It may be removed with fine abrasive. Coarse abrasives should not be used because they damage metal surfaces.

*3.5.1.11 Brass.* Brass push plates, kick plates, name plates, escutcheons, and other furnishings should be polished with a damp cloth and metal polish. Rub until tarnish is removed and polish with a clean, dry cloth. Do not allow polish to get on surface to which fixture is attached. Do not polish brass-plated fixtures (paragraph 6.2.35).

*3.5.1.12 Stainless Steel.* Stainless steel is easy to maintain. In most cases rain removes dust and dirt. Where chemical deposits pose a problem, periodic rinsing with fresh water is all that is needed. Salt from ocean spray and other chemical deposits should be rinsed off as soon as possible. When acid solutions are used to remove stubborn stains, be careful to rinse the solution off immediately and to follow safety precautions. Discoloration and possible corrosion occur if solder and welding flux are not removed at the time of installation. Flux can be washed off with a clean hot water at time of installation. Yellowish discoloration caused by welding can be removed with a mild abrasive or a phosphoric acid cleaner. Only steel wool should be used to maintain stainless steel. Fingerprints and scratching are caused by heavy pedestrian traffic. Detergent and water will usually remove fingerprints. If prints are stubborn use a clear white mineral oil or water cleaner. Scratches can be removed by rubbing with abrasive or a polishing cloth in the direction of the scratch marks in the finish. Usually, washing stainless steel with

clear water and wiping with a damp cloth will keep the surface sparkling. The following items may prove helpful in stubborn cases:

(1) When using abrasives or detergents, rub only in the direction of polishing lines.

(2) Always use the mildest process that will do the job.

(3) Remove corrosive chemicals immediately with clear water.

(4) To remove chewing gum use only wood or plastic, stainless steel, or chrome-plated tools; other knives or scrapers, scratch or leave metal particles.

(5) Always rinse after using detergents or abrasives, and wipe the surface dry to prevent streaking and spotting.

*3.5.1.13 Plated Metal.* Metal fixtures are usually made of iron or steel plated with copper, brass, nickel, or chromium. Almost all plating is done electrically and is generally very thin. Most faucets and hardware fixtures in toilet rooms are made of brass plated with nickel or chromium. Chromium is both alkali and acid proof and does not tarnish. Chromium-plated fixtures should be wiped with a damp sponge. Polishing with an abrasive cleaner will damage the plating and is not necessary. Nickel tarnishes slightly and needs occasional polishing with a fine abrasive. Escutcheons and other door hardware are usually made of iron on steel plated with a thin brass coating which has been lacquered to prevent tarnishing. Polishing should not be attempted because it will remove the lacquer and also the brass. Full description is found in paragraph 6.2.37.

*3.5.1.14 Lacquered Metal.* A clear lacquer usually lasts for several years without yellowing, cracking, chalking or collecting soil. Merely wiping with a clean cloth moistened with water, a mild soap or detergent will keep lacquered metal clean. Lacquer should be applied in the following manner:

(1) Strip old lacquer with a lacquer remover.

(2) Clean the surface with accepted materials and equipment. If not available use a solvent cleaner.

(3) Apply a uniform, wet coat of lacquer, preferably with spray equipment, according to directions. If spray equipment is not available, a clean paint brush can be used first thinning lacquer with a slow-evaporating solvent.

(4) Let the first coat dry thoroughly before applying the next coat.

**3.5.1.15 Plastics.** Most plastics used for outdoor lighting optics are either acrylic, polycarbonate, or butyrate and require some care in the selection of a cleaning process. Many of the strong solvents, alkaline solutions, and types of alcohol may damage plastics. Plastics are susceptible to damage (scratching) if abrasives are used. The above mentioned plastics should not be harmed when washed with trisodium phosphate, Naphtha, or mild soap solutions. Acrylic and butyrate plastics soften if exposed to boiling water. The temperature of cleaning solution should be limited to 200°F when cleaning acrylic plastics and 150°F when cleaning butyrate. Polycarbonate may withstand temperature to 280°F.

**3.5.1.16 Aluminum.** Aluminum trim, doors, panels and finishes with a factory-applied protective clear coating should be cleaned using a sponge and mild detergent and water solution. Abrasives should not be used as they remove the protective coating, resulting in discoloration of the metal. Aluminum surfaces without a protective coating should be cleaned with an aluminum cleaner recommended by aluminum manufacturers. All spillage and marks on adjacent surfaces should be removed.

## Section 6—CLEAN ROOMS

**3.6.1 General.** Clean Room is a work station or area with sub-micron filtered laminar air flow. It can be applied to an entire room. Interior appointments and efficient clean room operations are inter-dependent. Work benches, stools, tools, vacuum shoe cleaners, vacuum systems, exhaust hoods, air grills, and inter-communication systems should be simple, practical, consistent with work requirements, and easily maintained in clean-

conditions. A thorough evaluation of actual Clean Room maintenance needs could result in cost saving and increased production.

**3.6.2 Maintenance Requirements.** A dependable Clean Room housekeeping program requires careful and proper cleaning of all equipment and interior appointments. Such a program requires regular and repetitive vacuuming and wiping of walls, windows, and ceilings. Mop floors and clean equipment after each shift or more often if necessary. Cabinets and work benches, interiors and exteriors should be vacuumed and scrubbed with clean tepid water and a strong cleansing agent or liquid detergent (Federal Specification P-D-220). A housekeeping schedule should be developed which would specify type of cleaning materials and frequency of each maintenance requirement for different levels of cleanliness.

**3.6.3 Cleaning Processes.** Several cleaning processes are involved in the maintenance of clean rooms and these could be grouped under preliminary and final cleaning. Preliminary cleaning includes the removal of visual contaminants such as dirt, acid, fibers of all types, hydrocarbons, and other contaminants, or organic and inorganic.

**3.6.4 Cleaning Procedures.** Good housekeeping practices are of prime importance. The time to clean such rooms is when they are not in use, usually at the end of each work day. Contamination levels cannot be measured properly so that cleaning and re-cleaning of components and entire systems is necessary to achieve a state of utmost cleanliness.

**3.6.4.1 Four Basic Types of Preliminary Cleaning:**

(1) *Mechanical.* This includes wiping, grinding, abrasive buffing, and liquid blasting. This type of cleaning involves compressed air, wire brush, and liquid or centrifugal force.

(2) *Detergent Cleaning.* Detergents remove contaminants from surface by use of liquid detergents, alkaline salts and emulsion cleaners, and/or a combination of detergent and salts.

(3) *Chemical Cleaning*. This is a two-part system. Certain acids yield soluble salts by reaction with oxides and sulfides, and alkaline solutions solubilize metal oxides. Mineral acids (sulfuric and hydrochloric) and passivating acids (nitric and chromic) and organic acids remove contaminants successfully. Liquid detergent is used for wetting-out action.

(4) *Solvent Cleaning*. This cleaning lifts particles into the solution with the solvent. Such solvents are: Petroleum and coal tar solvents, non-flammable solvents, polar solvents (ketones, alcohol, phenols), chlorinated hydrocarbons, emulsifiable solutions, and diaphase solvents (solution with aqueous layered cleaner). This pre-cleaning method is implemented by spray, immersion and brushing action, vapor degreaser, and ultrasonic excitation.

3.6.4.2 *Final Cleaning*. Cleaning products must be able to remove practically all contamination which remains in the work area after precleaning.

3.6.4.3 *Cleaning Floors, Walls, Ceilings*. (chapter 3, section 1.)

3.6.4.4 *Specification Materials Detergents, Solvents*. Use Federal Specifications listed in table 2.

3.6.4.5 *Equipment*. Use Federal Specification items listed in table 2, and add the following: portable vacuum cleaner with exhaust filters and aluminum ladders.

3.6.4.6 *Selecting Cleaning Methods, Materials, Equipment*. Selection depends on the type of contaminants, materials of construction, and the degree of cleanliness required.

3.6.5 *Clean Work Stations*. Clean work stations offer a high degree of flexibility when clean rooms are not available or practical. Clean work stations exit contamination from the work space by 100 feet per minute air velocity (1 mile per hour). Maintenance procedures are the same as for clean rooms.

**3.6.6 Clothing Requirements (Minimum)**. Clothing can include many types of apparel

and different kinds of materials. Such materials are dacron, nylon, orlon, lintfree materials, and synthetic material. Footwear includes street shoes with booties, tennis shoes and tennis shoes covered with plastic booties. Other clothing ranges from cap and smock, to cap and coat, to coveralls and cap. The minimum clean room clothing required is smocks, caps, and clean room shoes. The fabric should be a non-flammable synthetic-type and no electrostatic properties. Smocks should be of simple design with no pockets and as few seams as possible. The cap should be the style worn in hospital operating rooms, covering the hair, so hair or dandruff will not fall in the clean room area.

**3.6.7 Personnel Training**. A method is needed to select the right personnel to maintain clean rooms. Maintenance personnel are frequently faced with challenges to clean unusual and intricate items where judgment could be quite important. Usually, cleaning procedures are designed to cover routine practices. Therefore, it is desirable to have maintenance personnel who possess above average intelligence, some mechanical ability, patience, and who are attentive to details. They should be knowledgeable in the use of all clean room tools. An important step in selecting such personnel should include classroom study plus on-the-job training. Training should include clarification of goals, value of equipment, the proper use of cleaning tools, and methods of doing the job. Classroom study should be conducted in a clean room environment, should explain the purpose of a clean room, define why utmost cleanliness is required, define cleanliness levels, explain the reasons for controlled environments, and the necessity to adhere to all clean room regulations. Personal hygiene should be stressed. Following classroom study, selected maintenance personnel should receive on-the-job training by working directly with an experienced employee. The new employee then should be interviewed by the supervisor and be assigned specific work tasks. Supervisors are to enforce good housekeeping practices.

**3.6.8 Personal Hygiene.** Personnel with skin or upper respiratory diseases should not be allowed to work in clean room operations. There are several problems and precautions involved in clean room maintenance operations. They are:

*3.6.8.1 Physiological:*

- (1) Allergies to synthetic fabrics.
- (2) Allergies to solvents being used in clean rooms.
- (3) Profuse nasal discharge, colds, coughs, sneezing.
- (4) High amounts of acid in moisture of hands.
- (5) Skin conditions which result in abnormal skin shedding, dandruff, or skin flaking.
- (6) Severe nervous conditions, itching, scratching, or claustrophobia.
- (7) Severe cases of sunburn.

*3.6.8.2 Habits, Disciplines:*

- (1) Bathe frequently.
- (2) Shampoo hair weekly, control dandruff.
- (3) Wear clean garments to insure maximum cleanliness.
- (4) Wear gloves over chapped hands.
- (5) Male personnel shave daily.
- (6) Keep hair confined under caps.

*3.6.8.3 Rules to be Enforced:*

- (1) Wash hands often.
- (2) Wear gloves.
- (3) Keep fingernails clean.
- (4) Never comb hair in clean room.
- (5) Do not wear fingernail polish.
- (6) Always wear specified clothing.
- (7) Never apply cosmetics in the clean room.
- (8) Personal items, such as keys, coins, cigarettes, matches, pencils, handkerchiefs, watches, tissue, and combs cannot be carried into the clean rooms.
- (9) Avoid wearing such items as jewelry, rings, necklaces, earrings, bracelets and lockets.
- (10) Keep parts and tools of work station as clean and orderly as possible.
- (11) Do not walk around unnecessarily.

(12) Do not eat food, chew gum or tobacco, or smoke in the clean room.

(13) Surgical head caps shall be worn at all times.

(14) When in doubt as to what you shall or shall not do, contact your supervisor.

**3.6.9 Lighting Equipment.** Clean room lighting equipment should be cleaned properly to maintain its high critical standards. Shadowless, uniform lighting at intensity levels of 100- to 150-foot candles is satisfactory for most clean rooms. Ceiling light fixtures should be flush-mounted and sealed to prevent airleaks. Fixtures should be accessible from above the ceiling. (paragraph 3.5.1.1.) Follow the latest revision to Federal Standard 209, Clean Room and Work Station Requirements.

## **Section 7—MAINTAINING CLEANING STANDARDS**

**3.7.1 Standards.** Cleaning standards are given in chapter 6, of this manual. Supervisors or foremen, as applicable, should thoroughly understand these standards. The quality of custodial services will depend on correct interpretation and application of these standards.

**3.7.2 Accomplishment.** \*Performance of cleaning operations should be checked weekly, or as often as necessary, to insure proper accomplishment. Checks should be made prior to, or immediately after, completion of a given job. This will allow supervisor to make a fair check of the work, and to determine whether improvements are necessary. Experienced workers will not usually require as much supervision as the inexperienced. Supervision serves its most useful purpose when the worker is given positive assistance in correct cleaning methods, rather than criticized for mistakes. For the Army DA Form 5105 (Janitorial Standards Checklist) (fig. 24) is used for such constructive criticism. DA Form 5105 is available through normal AG publications supply channels.

| JANITORIAL STANDARDS CHECKLIST  |         |          |           |                   |                        | DATE            |         |       |
|---|---------|----------|-----------|-------------------|------------------------|-----------------|---------|-------|
| For use of this form, see TM 5-609; the proponent agency is USACE.                        |         |          |           |                   |                        | 1 SEP 82        |         |       |
| Use reverse for remarks of additional spaces as required.                                 |         |          |           |                   |                        |                 |         |       |
| BUILDING  |         | OFFICE   |           | SUPERVISOR'S NAME |                        |                 |         |       |
| S-272 HQ  |         | JOHN DOW |           | HENRY SMITH       |                        |                 |         |       |
| CUSTODIAL SERVICES  |         |          |           |                   |                        |                 |         |       |
| Place a check mark in the column at each entry to indicate the quality of work performed. |         |          |           |                   |                        |                 |         |       |
| APPEARANCE OF FACILITY  | WASHING | DUSTING  | POLISHING | WAXING            | APPEARANCE OF FACILITY | RATING STANDARD |         |       |
|   |         |          |           |                   |                        | ABOVE           | AVERAGE | BELOW |
| FLOORS  | WAXING  |          | ✓         |                   | WAXING - CONTAINERS    | ✓               |         |       |
|   | WAXING  |          | ✓         |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
| HALLWAYS CORRIDORS  | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
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|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
| TOILETS   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
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|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
| VENETIAN BLINDS   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
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|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
| FURNITURE   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
| CLOSETS   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
| INTER CLASS   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
| WALLS/CEILINGS  | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
| LIGHT FIXTURES  | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |
|   | WAXING  | ✓        |           |                   | WAXING                 |                 | ✓       |       |

DA FORM 5105  
MAY 82

REPLACES DA FORM 1112, APR 67, WHICH IS OBSOLETE

Figure 24. DA Form 5105 (Janitorial Standards Checklist).

## Chapter 4

### ELEVATOR OPERATIONS

#### Section 1—GENERAL INSTRUCTIONS

**4.1.1 Purpose.** The purpose of this part of manual is to provide procedures for safe, efficient, and courteous elevator service.

#### 4.1.2 Personnel.

##### 4.1.2.1 Qualifications.

(1) One week's training under the direction of a competent operator should be required before an inexperienced operator can operate and be in charge of any passenger elevator.

(2) Two days' training under the direction of a competent operator should be required before an inexperienced operator can operate and be in charge of any freight elevator.

(3) Operators should be free from serious physical or mental defects, shall be not less than eighteen (18) years of age.

(4) Operators should be selected with consideration for their ability to perform their duties in a careful and competent manner.

**4.1.2.2 Appearance.** Elevator operators should be clean and neatly dressed; clothes pressed; shoes shined; hair neatly brushed or combed. Male operators should be cleanly shaven. Operators should stand erect and present an alert and efficient appearance.

**4.1.2.3 Relief.** Operators should not leave elevators until relieved. During relief periods, operators shall not remain in cars or corridors and talk to operators on duty. They should return promptly when relief period is over.

**4.1.2.4 Work Habits.** Operators should keep cars tidy. They should stand facing

front of car at all times while car is in motion, or while passengers are in elevator. Operators should not engage in unnecessary conversation with passengers, or volunteer unnecessary information about building or occupants. Information as to location of rooms of officials and employees should be furnished upon request.

#### Section 2—OPERATION

#### 4.2.1 Operating Instructions.

**4.2.1.1 Putting Elevator in Service.** Following rules should be observed when preparing to put elevator in service.

(1) Open hoistway and car doors when equipped for service key.

(2) Be certain car is at landing before stepping through doorway. Never assume car is where it was left.

(3) Use hall, lobby lights, or safety warning lights installed in some hoistways to determine if elevator is at landing.

(4) Enter car.

(5) Turn on lights.

(6) Turn on motor generator switch, if the elevator has one.

(7) Turn off "not running" lights or pick up "not running" signs, if provided.

(8) Close hoistway doors.

(9) Move car operating control to "start" position.

(10) Make trial inspection trip before carrying passengers. If any defect in equipment, performance, or any unusual noise is detected, facts should be reported immediately to the person in charge. Car is then taken out of service and not operated except

on instructions from elevator mechanic or supervisor.

#### 4.2.1.2 Operation of Elevator Controls:

(1) Car Switch Control—Manual Leveling.

(a) Movement of switch toward car gate causes elevator to go down. Movement of switch away from gate causes elevator to go up. Speed of car can usually be controlled by amount of movement of car switch.

(b) Operator should move car switch slowly in desired direction until full speed is attained. In stopping, car switch is brought slowly toward center position. Operation of switch in this manner prevents sudden starts and stops which are uncomfortable to passengers. Move control mechanism to the stop position on approaching a terminal landing, without waiting for the terminal stopping device to come into action.

(c) Operator should learn by practice to stop car level with floor. Making several attempts to level car with floor is hard on car and uncomfortable to passengers.

(d) Reversing of car switch should be done carefully. Before reversing direction, operator should bring car to complete stop.

(e) The slightest pressure of a floor button registers a call and the button becomes illuminated, thereby indicating to all subsequent passengers whether or not a call for a particular floor has been registered. This helps speed elevator service by eliminating the need of a passenger pressing the same button. The buttons remain illuminated until the car arrives at the terminal and parks or reverses its travel in answer to other calls. The controls also include a red emergency switch, an alarm button and a door open button which are readily accessible to the passenger. Where required, in addition to the above normal requirements, a switch to place the system in attendant operation may be included.

(2) Car Switch Control—Automatic Leveling. Operation is similar to that of manual control. However, operator needs to bring car only within leveling zone before centering switch. Zone is approximately 18

inches above and below floor level. When switch is centered within zone, car is brought automatically to the floor level and stopped.

4.2.1.3 Automatic Operation. To operate this type of elevator, it is necessary to press button of floor desired. Elevator will then start automatically, and stop at proper landing. Elevator also operates in response to signals from floor landings. Some elevators of this type have manual doors and gates. In these cases, doors and gates must be closed before pushing floor buttons.

4.2.1.4 Dual Operation.. Figure 25 shows control panel for dual operation elevator. An elevator of this type may be operated either manually or automatically. Usually, change-over is made by means of a key-operated switch. Manual operation is generally the same as operation with car switch control. If elevator has no car switch control, floor landing buttons are used in same manner as for automatic operation. When this is done, car can no longer be stopped by pressing landing buttons at floors, but they do indicate to operator that car is desired at certain landings.

4.2.1.5 Signal Control. To operate this type of elevator (fig. 25), operator presses buttons corresponding to floors desired by passengers. When all passengers are in car, operator moves controls to "start" position. This closes doors and starts car automatically. When car is in motion, operating control is returned to normal position. Car will stop at each floor for which button is pressed, and open doors automatically. Car will also stop in response to buttons pressed at floor landings.

**4.2.2 Standard Operating Expressions.** Expressions given below have been standardized for convenience of passengers, and to help operators provide uniform, courteous service.

4.2.2.1 Entering Elevator. As passengers enter elevator operator should:

(1) Say, "Going up" or "Going down," when doors open.

(2) Say, "Floors, please?" This is done before doors are closed. Repeat floor



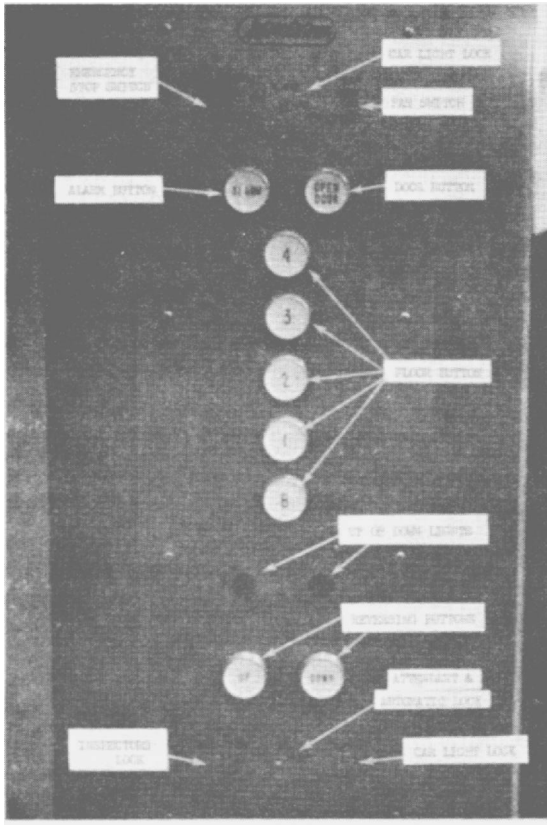


Figure 25. Elevator Control Panels.

numbers given. Be sure buttons for all stops requested are pressed before doors are closed.

(3) Say, "Next car, please," if more than maximum number of passengers attempt to enter car.

(4) Say, "Step back in car, please," in order to prevent crowding at car door.

(5) Ask passengers to, "Face front, please," if car is crowded and passengers are facing back or side of car.

4.2.2.2 *Approaching Floor.* As elevator approaches floor, operator should:

(1) Announce, "First floor," "Second floor," etc, as car slows to stop.

(2) Announce, "Street floor," as well as floor number, as, "First, street floor." This is necessary particularly in case of buildings on grade where street floor at one end is on different level from street level at other end of building.

4.2.2.3 *As Car Stops.* As car stops operator should:

(1) Say, "Please wait until car stops," if passengers attempt to alight from or enter while it is still leveling.

(2) Say, "Step up, please," or "Step down, please," if car does not stop level with landing sill. This is important as few people watch door sill when car stops.

### 4.2.3 Operating Procedures.

#### 4.2.3.1 *General:*

(1) Parked elevator is never placed in service except under direction of supervisor.

(2) When at main floor, operator stands at attention well within the car.

(3) Operator never steps outside the car except when relieved from duty. Relieving operator steps into car and takes over control before dismissed operator leaves. Passengers are never allowed to remain in car without operator.

(4) When more than one car in bank is at main floor terminal, operators in cars other than next car to be loaded should close gates, and extinguish car lights.

(5) Cars should never be overloaded. Certificate of inspection is authority for weight load or number of persons permitted to ride in elevator.

(6) Floor signals are not passed without instructions from supervisor, unless car is full and signal "Transfer" switch is thrown.

(7) Passengers should not be hurried. It is both dangerous and discourteous.

(8) Operators never give information or make statements, either written or verbal, in connection with accidents occurring in the building. If statements are to be made, they must be given in presence of building manager or supervisor.

(9) When the car is out of service, the control mechanism is left inoperative by pulling "Emergency Switch." Where a motor generator is installed, supervisor shuts down set.

(10) Operators should make complete trips to top floor unless instructed otherwise

by supervisor, or prevented by automatic dispatching systems.

(11) Emergency exits in either side or top of car must be closed when in motion.

(12) Before opening or closing doors, operator should extend arm across door opening and hold that position while doors are in motion. This action insures passengers are clear of gate or doors.

(13) Under no circumstance should operators attempt to repair, adjust, block open, or otherwise make inoperative hoistway door interlocks, car door or gate contacts, or emergency release.

(14) Operators should never open hoistway doors by emergency key.

(15) Unless specifically directed by supervisor, operators never allow material to be placed on top of elevator, or suspended beneath the car.

(16) Do not carry passengers or freight while inspections, repairs, or adjustments are in progress, and operate the elevator only in response to directions from the inspector or person in charge. Do not move the car when anyone is in the pit or on top of the elevator **EXCEPT AS THEY MAY DIRECT!**

#### *4.2.3.2 Operation of Passenger Elevators:*

(1) Operators should know maximum number of passengers allowed in car, and never allow the limit to be exceeded.

(2) Freight should not be carried in passenger elevators, except under specific instructions of supervisor. If freight is to be carried, elevator should be protected from damage.

#### *4.2.3.3 Operation of Service Elevators.*

Service elevators can carry either passengers or freight. They should contain safety devices required on passenger elevators. Under no conditions should maximum load be exceeded.

#### *4.2.3.4 Operation of Freight Elevators:*

(1) Do not allow overloading of elevators.

(2) Except by special permission of supervisor, only persons handling freight are allowed in cars.

(3) Extreme care should be taken when leveling cars at landing sill. This is to avoid tripping hazard and allow easy loading or unloading of cars.

(4) Car operating controls should be centered before attempting to move freight.

(a) On elevator controlled by hand rope, cable lock must be set before attempting to move freight.

(b) On automatic elevators, emergency switch should be opened before loading or unloading.

(5) When carrying loads which extend beyond top of elevator, either supervisor or mechanic should accompany the load, or it should be carried in accordance with their instructions.

(6) Following rules apply to handling loads greater than elevator capacity:

(a) Elevator mechanic is notified and his instructions are followed.

(b) If "safe lift" device is provided, mechanic should make adjustments.

(c) When unusually heavy loads are carried, mechanic operates elevator from machine room. Do not ride in the elevator, nor allow others to ride.

(7) Hoisting doors or gates shall always be closed and locked before the elevator is started. The elevator shall be brought to a stop at the landing level before the hoistway door or gate is opened.

#### *4.2.3.5 Operation of Hydraulic Elevators:*

(1) Elevator should be stopped gradually to avoid unnecessary wear and strain on equipment. Reverse cars only when necessary. Bring cars to full stop before reversing.

(2) Elevators of this type are left unattended only at lowest landing, resting on bumpers, with operating lever set in lowest position.

(3) Some elevators have no automatic braking device, so operators approaching top or bottom landings should slow cars in same manner as at other landings.

(4) Any tendency of cars to "creep," i.e., move up or down slightly after control switch is centered, should be reported immediately to supervisor.

#### 4.2.4 Emergency Procedures

4.2.4.1 *General.* Operator should remain calm under all conditions. In cases of emergency, he should assure passengers there is no cause for alarm, equipment has safeguards, and is well maintained by mechanics on duty and immediately available.

##### 4.2.4.2 *Emergency Devices:*

(1) *Emergency Stop Switch.* If operating switch control fails to stop car, emergency stop switch is thrown to “off” position. This cuts off power and applies brakes.

(2) *Emergency Release.* This button or switch, when pressed or thrown, permits operation of car even though hoistway or car doors are open. Safety codes demand this button or switch be placed under glass cover.

(a) Emergency release is used only under instructions of elevator mechanic or supervisor.

(b) Elevator is not to be operated unless glass cover is in place over emergency release button.

(c) Operator should report to his supervisor immediately if he finds emergency release cover broken.

(3) *Telephones in Emergencies.* If telephone is installed, emergencies are reported by calling number listed on certificate of inspection.

(4) *Emergency Communication Without Telephone.* Rap on doors and call for attention. Instruct person summoned to inform supervisor of need of assistance.

##### 4.2.4.3 *Types of Emergencies:*

(1) *Excessive Car Speed.* If excessive car speed is reached, operators should perform the following steps:

(a) Control switch should be moved to stop position.

(b) If car fails to stop, emergency switch is thrown to “off” position. Safety device will set, stop and hold car, or slowdown devices at top and bottom of hoistway will stop car.

(c) Do not jump, or allow passengers to jump, from car when in motion.

(2) *Car Stalled Away From Landing.* If at any time elevator stops suddenly due to

power failure, application of undercar safety device, etc, operator should perform following steps:

(a) Move operating control to stop position.

(b) Throw emergency stop switch to “off” position.

(c) Turn off motor generator set and leveling switch, if any.

(d) Notify supervisor’s office immediately.

(e) Operator can remove passengers from stalled elevator only under following conditions:

1. If operator can open hoistway doors immediately and safely.

2. Car is in leveling zone, and passengers can step easily from car to corridor. Passengers should be warned of low head clearances when leaving car.

*CAUTION:* Side or top emergency exits may be used only on instructions from elevator mechanic or supervisor.

(3) *Car Striking Obstruction.* Car should be stopped by centering operating control switch, and throwing emergency stop switch. Supervisor is then notified.

(4) *Person Caught Between Car and Hoistway.* Car is stopped by emergency methods. Rescue is made only under instructions by supervisor and mechanic.

(5) *Fire Alarm or Panic.* Unless specifically instructed otherwise, operator should run car nonstop to street level. Operator should call the Fire Department, report to designated official, and await further instructions.

##### 4.2.4.4 *Reports:*

(1) *Report of Accident.* If the car stalls or a passenger becomes sick or is injured, names and addresses of persons involved and witnesses, along with report of facts pertaining to incident, should be reported to supervisor.

(2) *Report of Emergency Service.* In instances where passengers are being trapped in stalled car, operator should report to supervisor. Car is put back in service only on instructions from supervisor or elevator mechanic.

#### **4.2.5 Repairs to Elevators.**

*4.2.5.1 General.* Supervisors should be informed of routine inspections and repair of elevators. If operators are needed during repair periods, they take orders from chief elevator mechanic. Supervisor should be notified when car is ready for service.

*4.2.5.2 During Repairs.* Under no circumstances will an operator leave car under repair unless specifically instructed to do so by elevator mechanic.

#### **4.2.6 Taking Elevator Out of Service.**

*4.2.6.1 Parking.* Elevator should be parked and taken out of service at regular parking landing.

*4.2.6.2 Procedure.* After parking, the following steps should be performed:

(1) Place operating control in stop or locked position.

(2) Shut off motor generator set and remove key, and close elevator gate. If shut down is for short period only, throw emergency stop or safety switch in "off" position.

(3) Turn on "not running" lights or position "not running" signs, as required by supervisor.

(4) Turn off fan.

(5) Turn out lights.

(6) Shut car gate.

(7) Shut hoistway door if car is equipped with service key.

## Chapter 5

### SAFETY

**5.1.1 General.** Custodial services operations expose personnel and material to potentially hazardous conditions. In order to insure safe operating conditions, the principles of accident prevention must become an integral part of all custodial operations. Supervisors are responsible for insuring that respective military agencies safety regulations and manuals are followed. Unsafe practices and/or conditions will be immediately called to the attention of the supervisor for remedial or corrective action. Conditions beyond the supervisor's responsibility will be referred by him to the higher authority for corrective action. Custodial personnel must be thoroughly indoctrinated on safe operating procedures and precautions essential to the safe and efficient accomplishment of their tasks.

**5.2.1 Use of Materials.** With the rapid development of concentrated cleaning materials, and improvement of equipment for effective accomplishment of custodial services, it is essential that the custodial worker be trained to identify the various types of materials and equipment and to know their limits and restrictions of application. Some concentrated cleaning materials produce a detergent up to fifty times the volume of the concentrate. They are shipped in plastic containers 1" x 1" x 5". Some cleaning materials while applicable to the same cleaning activity, contain different chemical properties, which if mixed would produce dangerous toxic gases. The instructions on the containers should be followed closely, particularly with respect to use in well ventilated areas. Stock-listed items specifically designed for military custodial services should be used unless approval has been given by the installation for use of other than stocklisted cleaning agents.

Most cleaning materials contain agents which will cause skin irritation when permitted to remain in contact with the skin for prolonged period of time. Rubber gloves are recommended as a means of protecting the hands.

Situations which could or do effect the workers' health should be immediately reported to the installation Medical Service for evaluation.

**5.2.2 Floor Waxes.** Floor waxes may fall within the following categories:

*5.2.2.1. Liquid Emulsion Wax.* A dispersion of natural and synthetic waxes with small amounts of resins, leveling agents, and other substances in water.

*5.2.2.2. Water Emulsion Finish.* Water emulsion finish is slip resistant and is intended for use on asphalt tile, rubber tile,, vinyl tile, linoleum and other floor surfaces. It should not be used on wooden floors unless properly sealed.

*5.2.2.3 Solvent Wax.* Is a dispersion of natural and synthetic waxes or resins in naphthas, turpentine, or other solvents, and is not recommended for resilient such as rubber or asphalt. This wax is flammable.

*5.2.2.4 Paste Wax,* Similar to liquid solvent wax but containing a greater proportion of solids. This wax is flammable the same as the liquid solvent wax.

*5.2.2.5* Care must be exercised in the use of solvent type waxes, since they emit gases due to the vehicle used for the wax. The buffer used with a steel wool pad, if contact is made with metal while buffing the floor could create a friction spark and cause a flash ignition of the gases.



**Figure 26. Safety Mobile Adjustable Type Ladder.**

**5.3.1 Use of Equipment.** While safety measures have been discussed throughout the manual, the following items should be given special attention.

**5.3.1.1 Ladders and Safety Belts.** Step ladder treads should be level with ground when ladder is open. An automatic spreader or locking device should be provided to lock step ladders in open position. Metal ladders should not be used for work near electrical conductors or devices. Where hooks are installed, it is recommended that safety belts be used when washing window exteriors above the first floor. Ladders in continuous service should be inspected daily. Ladders found to be defective should be taken out of service for repair or salvage, fig. 26.

**5.3.1.2 Containers.** All containers used for storage purposes must have tightly closing lids. Under no circumstances will flammable materials be stored in open containers. Contents should be clearly indicated on exterior

of cans. Closets and supply cabinets should be inspected regularly to prevent accumulation of waste materials and unsafe storage of supplies.

**5.3.1.3 Electrical Equipment.** Equipment should be maintained in such a manner as to insure safety of personnel and to reduce fire hazards to a minimum. All electrical equipment, metal frames, and other parts associated with electrical equipment should be connected to a low resistance ground. Any electrical equipment found to be defective during daily inspection and use will be withdrawn from service immediately for repair.

**5.3.1.4 Keeping Equipment Out of Traffic Lanes.** Workers are instructed not to place mop pails, mops, brooms, soaps, or other equipment in traffic lanes where personnel might stumble and fall over them.

**5.4.1 Wet or Waxed Floors.** Workers are instructed to warn personnel approaching slippery floors while mopping or waxing is in progress. If it is necessary for workers to leave before floors are dry, signs and barriers should be erected to prevent accidents. To prevent buildup of brittle, slippery wax—keep floors stripped according to schedule. Repair worn floors promptly. Repair or replace loose or curled tiles, cupped wood, holes and cracks. Avoid



**Figure 27. Good Safety Practice for Floor Waxing and Stripping Operations.**

natural soaps, as the remaining film is slippery. If used, rinse thoroughly when wet. When rinsing, cleaning, waxing, sealing or stripping floors, use "wet floors" or similar caution signs, placed so that they are visible from all approaches. Dry each section carefully before proceeding to the next, fig. 27. Adequate lighting will prevent persons walking into obstructions or tripping over small objects. Mop or vacuum immediately all spilled liquids, or suds. Remove oil drippings or grease spots immediately by vacuum, scraping or mopping, or by using a nonflammable oil absorbent. Never use solvents on composition floors as they will cause softening and damage to the tiles. To lessen slip problems, adhesive carborundum strips may be used on stair treads and ramps. Purchase only those floor finishes, waxes and coatings which have good anti-slip qualities. Never move furniture when the floor is wet.

**5.5.1 Fire Prevention.** Good housekeeping is of utmost importance in preventing fires. Accumulation of rubbish and combustible wastes are frequent sources of fire. Observance of prescribed fire-prevention practices in the vicinity of flammable gases and vapors is absolutely essential in order to avoid accidental ignition or explosion. Using services and operating personnel are also

responsible for elimination of fire hazards.

**5.5.1.1 Volatile Cleaning Agents.** The use of volatile or flammable liquids for cleaning floors is not permitted. Treated sweeping mops and dusters also present a fire hazard, and they should be kept in ventilated metal containers.

**5.6.1 Chlorine Bleach Should Not be Mixed With Other Materials.** The use of rubber gloves to prevent caustic action or irritation of the skin when using oxalic acid and trisodium phosphate is mandatory.

**5.7.1 Lifting.** When manually lifting loads, it is important that safe lifting limits be adhered to. Fifty pounds is the maximum recommended safe weight which may be lifted by a male worker performing continuous or repetitive lifting of materials in compact form. Twenty-five pounds is the maximum recommended safe weight for female workers under similar conditions. The proper lifting procedure is for the worker to first make certain his footing is secure, then grasp the load so that it may be held without becoming unbalanced, then to lift from a squatting position with his back straight and his legs exerting the primary lifting force.

## Chapter 6

### TRAINING GUIDE

#### OUTLINES OF JANITORIAL OPERATIONS FOR ON-THE-JOB USE

##### Section 1—GENERAL

**6.1.1 Purpose.** This part of the manual is made up of descriptive work outlines for on-the-job use, and as an aid to training. They are intended as a supplement to information given in preceding parts of this manual.

**6.1.2 Scope.** The outlines list equipment and supplies needed, procedures for doing the work, and instructions for care of equipment after completion of the job. Careful application of these instructions will help the worker produce efficient, thorough, custodial services.

##### Section 2—OUTLINES

###### 6.2.1 Treating Sweeping Mops, Yarn Dusters, and Dustcloths.

###### 6.2.1.1 *Equipment Needed:*

- (1) Hand spray gun (bottle).
- (2) Metal mop pan 8" wide, 8" high, 24" long with cover.
- (3) Large mop bucket.
- (4) Container for mop treatment solution.

###### 6.2.1.2 *Materials Needed:*

- (1) Liquid mop treating compound.

###### 6.2.1.3 *Getting Mops Ready:*

- (1) Before treatment, new mops, dusters and cloths require soaking in hot water. Soaking tightens the yarn.
- (2) Old mops or dusters do not require soaking before treatment, but should be washed clean in solution of 1 tablespoon

trisodium phosphate to 1 gallon of warm water, and then rinsed thoroughly.

###### 6.2.1.4 *Doing the Job:*

- (1) After mops have dried and yarn is straightened and combed, mop should be soaked in a mop treating compound, wrung out, and hung up to dry.

- (2) Properly treated mops will be fluffy and light to handle. They will not feel damp and yarn will not be soggy or matted.

- (3) After treatment, fold mop yarn together, roll tightly, and place in closed metal container for about eight hours. This allows solution to spread evenly throughout the mop. Treat dusters and cloths similarly.

###### 6.2.1.5 *Care of Equipment:*

- (1) Clean all equipment thoroughly.
- (2) Remove spots from floor or table.
- (3) Dispose of wiping cloths.
- (4) Return all supplies and equipment to their proper storage place.

###### 6.2.2 Washing Sweeping Mops, Dusters, and Dustcloths.

###### 6.2.2.1 *Equipment Needed:*

- (1) Mop bucket, large can or bucket and wringer or squeezer.
- (2) Palmetto Brush.

###### 6.2.2.2 *Materials Needed:*

- (1) Warm water.
- (2) TSP (Trisodium Phosphate).

###### 6.2.2.3 *Getting Mop Heads, Dusters, or Dustcloths Ready:*

- (1) Remove mop heads from handles.



(2) Shake mop heads, dusters, or dust-cloths to remove as much dirt as possible.

#### 6.2.2.4 *Doing the Job:*

(1) Wash mop heads, dusters or dust-cloths clean in a solution of one tablespoon of trisodium phosphate to one gallon of water by working them vigorously with plumber's friend or broom handle.

(2) Rinse thoroughly in clear, lukewarm water, wring them as dry as possible with wringer or squeezer.

(3) Hang them up to dry where there is good air circulation.

(4) When dry, comb yarn out with palmetto brush.

(5) Mop heads, dusters or dustcloths, when dry, should be light grey in color, light, and fluffy. There should be no soggy or matted yarn.

#### 6.2.2.5 *Care of Equipment:*

(1) Clean all equipment thoroughly.

(2) Return all supplies and equipment to their proper storage places.

### 6.2.3 **Proper Handling of Sweeping Mops.**

#### 6.2.3.1 *Handling a Sweeping Mop or Swivel Dust Mop for Office Sweeping:*

(1) Start mop at foot farthest from pushing hand, mop in circular motion, keeping dirt ahead of mop.

(a) Do not lift mop from floor or it will drop dirt gathered.

(b) Do not bear down on mop.

(c) Stand erect to prevent undue fatigue.

(2) Sweep out corners as you come to them.

(3) Shake mop in dustbox. Hold mop in box while shaking but do not allow mop to contact dirt in bottom of box.

#### 6.2.3.2 *Handling Mops for Continuous Push Method:*

(1) *Straight Sweeping Mop or Swivel Mop:*

(a) Push mop as you walk. Do not lift mop from floor.

(b) Shake mop into dustbox.

(2) *V-Type Sweeping Mop:*

(a) Push forward from comfortable position between handles. Do not lift mop from floor.

(b) Shake mop out at place where dirt is to be picked up.

### 6.2.4.1 **Sweeping an Office With a Sweeping Mop.**

#### 6.2.4.1 *Equipment Needed:*

(1) Eighteen-inch sweeping mop, V-type mop, or swivel dust mop.

(2) Radiator brush, counter brush.

(3) Dustbox, dustpan.

(4) Waste paper container.

(5) Putty knife.

#### 6.2.4.2 *Materials Needed:* None.

#### 6.2.4.3 *Before Sweeping:*

(1) Place all equipment in hall near office door.

(2) Pick up paper and large litter from floor and place in waste basket. Empty pencil sharpener receptacles in waste baskets and replace them.

(3) Empty waste baskets into noncombustible waste paper container.

(4) Clean radiators with radiator brush.

(5) Place sweeping mop, dustbox, dustpan, and counter brush in convenient location near center of room.

#### 6.2.4.4 *Doing the Job:*

(1) Mop-sweep floor as described in paragraph 6.2.3, fig. 28.

(2) As turns are made around room, shake dirt into dustbox. (If V-type mop is used, shake into pile near dustbox.)

(3) Remove with putty knife all gum or dirt sticking to floor.

(4) Gather sweepings into dustpan with counter brush and empty into dustbox.

(5) Collect sweeping tools.

(6) There should be no litter on floor, behind radiators or in corners and room should have a well-kept appearance.

6.2.4.5 *Before Leaving Room.* Replace all furniture, waste baskets, etc., turn off lights, and close doors and windows.

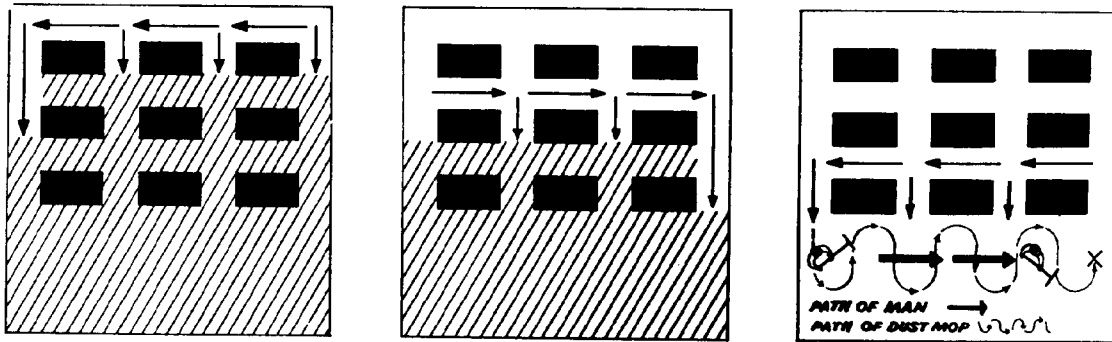


Figure 28. Mop Sweeping an Office.

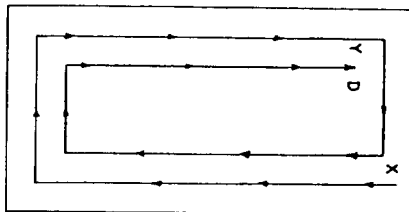


Figure 29. Corridor Mop Sweeping Pattern.

### 6.2.5 Sweeping a Corridor With Sweeping Mop Using Continuous Push Method.

#### 6.2.5.1 Equipment Needed:

(1) Twenty-seven-inch or 36-inch sweeping mop, or V-type mop, or swivel mop.

- (2) Radiator brush and counter brush.
- (3) Dustbox and dustpan.
- (4) Putty knife.

#### 6.2.5.2. Materials Needed: None.

#### 6.2.5.3 Before Sweeping:

- (1) Place dustbox and tools at convenient place for shaking sweeping mop.
- (2) Brush radiators clean with radiator brush, and use counter brush to sweep under radiator or other space impossible to reach with sweeping mop.

#### 6.2.5.4 Doing the job:

- (1) Begin along one side and sweep length of corridor, turn at end sweeping corner and along sides (fig. 29).
- (2) At starting point, shake mop, into dustbox (if V-type mop is used shake into a pile beside box).

(3) Continue sweeping in pattern shown in illustration until operation is completed.

(4) Gather sweeping pile into dustpan with counter brush and empty dustpan into dustbox.

(5) Remove gum or dirt sticking to floor by use of putty knife as it is reached in the course of sweeping.

(6) There should be no dust streaks, dirt in corners, or where dustbox stood. There should be no dirt where sweepings were gathered with counter brush and dustpan.

6.2.5.5 Before Leaving. Turn out lights, close doors and windows, if necessary.

### 6.2.6 Mop Sweeping a Gymnasium Using the Continuous Push Method.

#### 6.2.6.1 Equipment Needed:

- (1) Large sweeping mop or V-type mop, and 24-inch brush broom.
- (2) Counter brush.
- (3) Dustpan and dustbox.
- (4) Putty knife.

#### 6.2.6.2 Materials Needed: None.

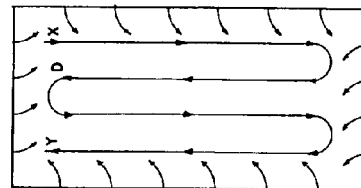


Figure 30. Gymnasium Mop Sweeping Pattern.

#### 6.2.6.3 *Before Sweeping:*

- (1) Clear all gym equipment from floor.
- (2) Place dustbox and tools near corner opposite entrance door, at least five feet from end and ten feet from side wall.

#### 6.2.6.4 *Doing the Job*

- (1) Sweep dirt out from wall with bristle brush.
- (2) Start sweeping in corner near dustbox and follow pattern as shown in illustration, fig. 30.
- (3) Upon return to dustbox, push sweepings across to finishing point of *next* round trip. Shake dirt into dustbox and push box to point beyond finishing point of next trip.
- (4) Repeat process until entire floor surface is swept.
- (5) Remove gum and sticky dirt with a putty knife.
- (6) Gather sweepings into dustpan with counter brush and empty pan into dustbox.
- (7) Collect sweeping tools.
- (8) There should be no dust streaks, no dirt in corners, or where dust was gathered, or where dustbox was placed.

#### 6.2.6.5 *Before Leaving:*

- (1) All gym equipment will be replaced as required.
- (2) See that all doors and windows are closed unless instructed otherwise.
- (3) Remove all waste and rubbish from interior of building.
- (4) All lights to be turned off as required.

### 6.2.7 **Sweeping an Office With a Floor Brush.**

#### 6.2.7.1 *Equipment Needed:*

- (1) Eighteen-inch floor brush with handle cut to proper length, counter, radiator, and nail brushes.
- (2) Dustpan and waste paper container.
- (3) Putty knife.

#### 6.2.7.2 *Materials Needed:* None.

#### 6.2.7.3 *Before Sweeping:*

- (1) Place equipment in hall near door.

- (2) Pick up paper and large litter from floor and place in waste basket. Empty pencil sharpener receptacles in waste baskets and replace them.

- (3) Empty waste baskets in waste paper container.

- (4) Clean out radiators with radiator brush.

- (5) Use counter brush to sweep areas hard to reach with floor brush.

- (6) Empty ash tray into separate metal container and clear with damp cloth.

#### 6.2.7.4 *Doing the Job:*

- (1) Start at corners farthest from door.

- (2) Sweep so that entire floor will be swept when door is reached, keeping main body of dirt moving through main open area after sweeping from under desks and out of smaller areas.

- (3) With putty knife, remove gum or dirt sticking to floor as it is reached in course of sweeping.

- (4) Push dirt in pile near door, gather sweepings into dustpan with counter brush, and empty dustpan into dustbox.

- (5) The floor should have no dust streaks or dirt in corners, under radiators, etc. Room should have a tidy, well-kept appearance.

#### 6.2.7.5 *Before Leaving Room:*

- (1) Replace all furniture, waste baskets, etc.

- (2) Close windows.

- (3) Turn out lights.

#### 6.2.7.6 *Caring for Floor Brush:*

- (1) Change handle from one side of brush to the other, at least once a week.

- (2) Hang brush up when not in use. Insure that bristles are free to hang loosely.

- (3) Comb out bristles with nail brush several times each day brush is used.

- (4) Avoid getting brush wet or oily. If bristles should get wet, comb bristles with nail brush and hang brush up so bristles can dry.

- (5) Do not use a good bristle brush on rough concrete floor.

### 6.2.8 Sweeping a Corridor With a Floor Brush.

#### 6.2.8.1 Equipment Needed:

- (1) Large floor brush; counter, radiator and nail brushes.
- (2) Dustpan and dustbox.
- (3) Putty knife.

#### 6.2.8.2 Doing the Job:

- (1) Start sweeping at end of corridor next to wall. (fig. 31)
- (2) Sweep in manner indicated in figure 31.
- (3) Gather sweepings in pile at end of corridor. Using counter brush, pick up sweeping into dustpan and empty dustpan into dustbox.
- (4) Collect sweeping tools.
- (5) There should be no dust streaks, no dirt under radiators, in corners or where dirt was gathered into dustpan.
- (6) Clean elevator floor same as adjacent area.

#### 6.2.8.3 Before Leaving Room:

- (1) Close doors and windows if necessary.
- (2) Turn out lights.

### 6.2.9 Sweeping a Gymnasium With a Floor Brush or Power Sweeper.

#### 6.2.9.1 Equipment Needed:

- (1) Thirty-inch floor brush.
- (2) Dustpan and dustbox.
- (3) Radiator brush, counter brush, and nail brush.
- (4) Putty knife.
- (5) Power sweeper.

#### 6.2.9.2 Materials Needed: None.

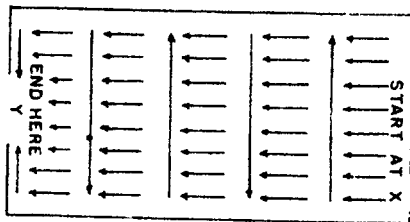


Figure 31. Push Broom Sweeping Pattern.

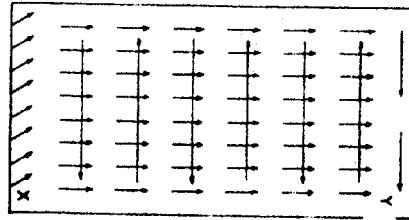


Figure 32. Gymnasium Floor Brush Sweeping.

#### 6.2.9.3 Before Sweeping:

- (1) Place dustbox and tools at entrance of gymnasium (point "Y," figure 32).
- (2) Clean out radiators with radiator brush.
- (3) Sweep hard-to-reach places with counter brush.

#### 6.2.9.4 Doing the Job:

- (1) Start sweeping at point "X" in Illustration and sweep as indicated by arrows, fig. 32.
- (2) Comb floor brush bristles occasionally with nail brush.
- (3) With putty knife, remove gum or dirt sticking to floor.
- (4) Gather sweepings in pile at corner nearest entrance. With counter brush and dustpan, pick up sweepings. Empty dustpan into dustbox.
- (5) Collect sweeping tools.
- (6) When the job is complete, there should be no dust streaks. Areas under and behind radiators or other fixtures should be free from dirt.

#### 6.2.9.5 Before Leaving:

- (1) Close windows and doors unless instructed otherwise.
- (2) Turn out lights.

### 6.2.10 Mop Sweeping Auditorium or Theater Having Fixed Seats.

#### 6.2.10.1 Equipment Needed:

- (1) Eighteen-inch sweeping mop or V-type mop, and counter brush.
- (2) Dustpan and dustbox.
- (3) Putty knife.

#### 6.2.10.2 Materials Needed: None.

6.2.10.3 Before Sweeping:

(1) Place dustpan and counter brush at lower end of aisle 1. (fig. 33 "pick up dirt here.")

(2) Place dustbox at point "DB" of illustration.

6.2.10.4 Doing the Job:

(1) Start at point "X" (in fig. 33) and sweep space back of seats, push dirt into aisles and past rear row of seats. Enter space between last two rows of section A and sweep toward aisle 2, turning seats up and sweeping under them. When aisle 2 is

reached, sweep dirt past next row of seats.

(2) Shake straight mop into dustbox and push box past next row of seats (If V-type mop is used, shake into a sweeping pile). Continue in same manner until aisle 4 is reached. Sweep down aisle 4 past next row of seats, then enter between next two rows of seats in section C.

(3) Repeat sweeping procedure until entire auditorium is finished.

(4) Remove gum with putty knife as reached in sweeping.

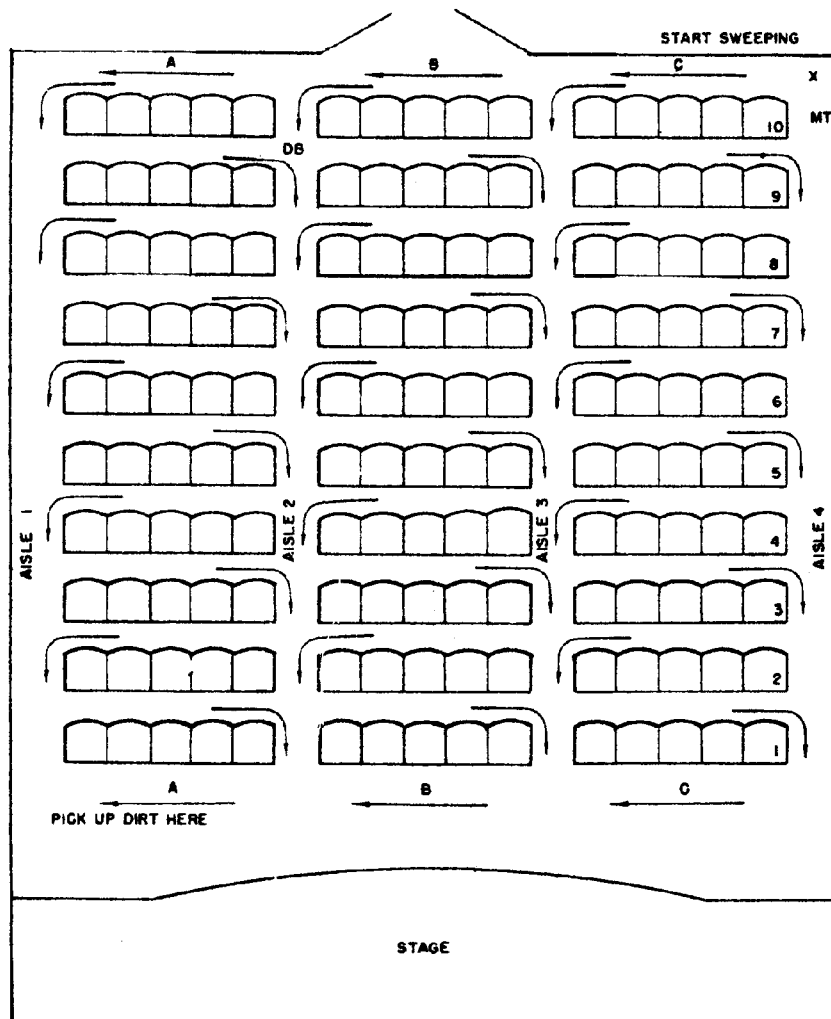


Figure 33. Theater Sweeping Pattern.

(5) With counter brush, pick up sweepings in front of stage.

(6) When the job is complete there should be no accumulation of dirt, and corners and spaces under seats should be clean.

*6.2.10.5 Before Leaving:*

- (1) Close all doors and windows.
- (2) Turn out lights.

**6.2.11 Sweeping an Auditorium or Theater With a Floor Brush.**

*6.2.11.1 Equipment Needed:*

- (1) Eighteen-inch floor brush.
- (2) Dustpan and dustbox.
- (3) Counter brush, radiator and nail brushes.
- (4) Putty knife.

*6.2.11.2 Materials Needed:* None.

*6.2.11.3 Before Sweeping:*

(1) Place dustpan, dustbox, and tools at lower end of aisle as indicated in figure 33 where labeled "pick up dirt here."

- (2) Brush dust from radiators.

*6.2.11.4 Doing the Job:*

(1) Follow steps and illustration in paragraph 6.2.10 "Doing the Job," but, do not shake the brush into the dustbox.

(2) When the job is complete the room should be clean throughout; there should be no accumulations of dirt behind legs of seats, or in corners.

*6.2.11.5 Before Leaving.* Close all doors and windows unless instructed otherwise.

**6.2.12 Sweeping a Stairway.**

*6.2.12.1 Equipment Needed:*

- (1) Eighteen-inch sweeping brush and counter brush.
- (2) Dustpan and dustbox.
- (3) Putty knife.
- (4) Dustcloth.
- (5) Vacuum cleaner, back-pack type.

*6.2.12.2 Materials Needed.* None.

*6.2.12.3 Before Sweeping.* Place dustpan, counter brush, and dustbox at foot of stairs; go to landing at top of stairs.

*6.2.12.4 Doing the Job:*

(1) Brush dust from radiators.

(2) Start sweeping top landing and sweep all stairs and landings from top to bottom landing, taking care to remove all dirt from corners of stair treads. Use putty knife to remove gum, etc. Dust rail, balusters and dado as sweeping proceeds.

(3) Gather sweepings into dustpan with counter brush and empty pan into dustbox.

(4) When the job is completed, the stair should have no dust marks, no dirt in corners, and rail, balusters and dado should be free from dust.

- (5) Return equipment to storage.

**6.2.13 Mopping Unwaxed Wood, Linoleum, Rubber, Vinyl or Asphalt Tile Floors.**

*6.2.13.1 Equipment Needed:*

- (1) Two cotton mops.
- (2) Two mop buckets with wringers, or a two-tank mop truck.
- (3) Putty knife.
- (4) Dry cloth.

*6.2.13.2 Materials Needed:*

- (1) Warm water.
- (2) All-purpose synthetic detergent.

*6.2.13.3 Before Mopping:*

(1) Have floor swept thoroughly.

(2) Fill buckets or tanks with warm water, adding 1/2 to 3/4 cup of all-purpose synthetic detergent to each three gallons of water (depending on the amount of dirt to be removed) in pail or tank.

- (3) Stir solution thoroughly.

(4) Place mops and buckets about 15 feet from corner or end of room farthest from entrance; wet floor where buckets will stand to prevent rings; keep mops in buckets when not in use.

*6.2.13.4 Doing the Job:*

(1) Take the mop from solution bucket and wring it out enough so it does not drip.

(2) Starting in corner, draw mop along baseboard about eight feet; return to corner and repeat action along Intersecting wall. Do not splash baseboard. If water does splash on the baseboard, remove with a dry cloth.

(3) Starting in corner, swing mop in long strokes of about six to seven feet, being careful to cover all of floor. Mop should never be wet enough to leave water standing on floor. Mop wood floors parallel to grain.

(4) Step back as mopping proceeds.

(5) Wet mop as required. Always wring mop to prevent dripping.

(6) When an area seven to eight feet square has been mopped, rinse the area using the other mop in same manner as described in steps (2) to (5).

(7) Rinse mop, and wring out as much water as possible.

(8) Dry mop area as described in steps (2) thru (5).

(9) Move buckets and mops down floor about eight feet, and mop another area about eight feet square.

(10) Repeat process until entire floor is mopped.

(11) Change mop and rinse water when they become too dirty for effective cleaning.

(12) Use putty knife to remove gum.

(13) Pick up any strings dropped by mops.

(14) A properly mopped floor should have an evenly cleaned surface; baseboards should not have been splashed; there should be no water left standing on floor, and water should not have been allowed to seep under baseboards.

**6.2.13.5 Before Leaving.** Replace furniture, close all doors and windows. Turn out lights.

**6.2.13.6 Care of Equipment:**

(1) Rinse out both mops in clear water; wring them out as dry as possible; hang mops up to dry.

(2) Clean mop buckets or mop trucks.

(3) Return all supplies and equipment to proper storage space.

#### **6.2.14 Mopping Terrazzo, Mosaic Tile, Ceramic Tile, Slate or Marble Floors.**

(Does not include conductive floors)

**6.2.14.1 Equipment Needed:**

(1) Two cotton or linen slasher mops.

(2) Two mop buckets with wringers or a two-tank mop truck.

(3) Floor squeegee.

(4) Putty knife.

**6.2.14.2 Materials Needed:**

(1) Warm water.

(2) Neutral Liquid cleaner.

**6.2.14.3 Before Mopping:**

(1) Follow instructions for “before mopping” of paragraph 6.2.13, except reduce the amount of detergent to a minimum that will do the job.

**6.2.14.4 Doing the Job:**

(1) Follow steps (1) to (5) in “doing the job,” paragraph 6.2.13.

(2) Use squeegee to remove detergent solution from floor, starting near corner and moving toward mop pails or truck.

(3) If squeegee and pickup pan are not available, rinse detergent solution mop; wring out as dry as possible and pick up detergent solution on floor.

(4) Use rinse mop to rinse entire area covered as in steps (2) to (5) of “doing the job,” paragraph 6.2.13.

(5) Dry mop area with rinse mop as described in steps (2) to (5) of “doing the job,” paragraph 6.2.13.

(6) Follow steps (9) to (14) of “doing the job,” paragraph 6.2.13.

**6.2.14.5 Before Leaving.** Replace furniture, close all doors and windows unless otherwise instructed, and turn out lights.

**6.2.14.6 Care of Equipment:**

(1) Rinse out mops in clear water; wring them as dry as possible; hang them up to dry.

(2) Clean mop buckets or mop truck.

(3) Return supplies, and equipment to storage.

*Note:* If floor area is large, time can be saved by having two men do the job. One man apply the detergent solution, the other use the squeegee and pickup pan, and change water when it becomes dirty. If no squeegee and pickup pan are available, the second man should rinse and dry mop.

### 6.2.15 Damp Mopping a Waxed Floor.

#### 6.2.15.1 Equipment Needed:

- (1) Two clean mops. (If mops have been used previously with detergent solution, rinse mops carefully in warm water.)
- (2) Two mop buckets with wringers, or two-tank mop truck.
- (3) Putty knife.
- (4) Dry cloth.

6.2.15.2 *Materials Needed.* Clear water, and all-purpose synthetic detergent.

#### 6.2.15.3 Before Mopping:

- (1) Thoroughly sweep floor.
- (2) Mix small amount of detergent in water if required, to remove soil.
- (3) Place mop bucket or truck about eight feet from wall or corner farthest from entrance to room.

#### 6.2.15.4 Doing the Job:

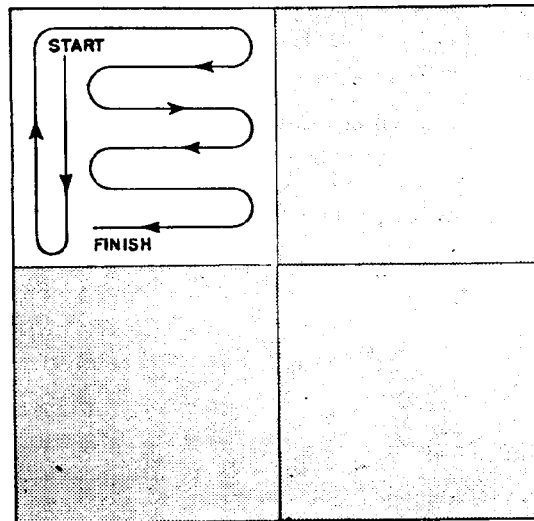
- (1) Take mop from bucket or tank and wring to prevent dripping.
- (2) Follow steps (2) to (10) in “doing the job,” paragraph 6.2.13.4.
- (3) A properly damp-mopped floor should dry within a few minutes; there should be no damp spots, surface should be evenly cleaned, and any water splashed on baseboards or furnishings of room should have been removed, fig. 34.

6.2.15.5 *Before Leaving.* Close all doors and windows and turn out lights.

#### 6.2.15.6 Care of Equipment:

- (1) Rinse out mop; wring out as dry as possible; hang it up to dry.
- (2) Clean mop bucket or truck.
- (3) Return all supplies and equipment to storage.

**6.2.16 Mopping an Office Floor.** If floor is unwaxed wood, rubber, vinyl, mastipave, as-



MOP SECTION WITH SIDE-TO-SIDE STROKES



Figure 34. Damp Mopping a Floor Section.

phalt tile, or linoleum, follow instructions in paragraph 6.2.13. If floor is terrazzo, mosaic tile, ceramic tile, slate, or marble, follow instructions in paragraph 6.2.14. If floor is waxed, follow instructions in paragraph 6.2.15. In addition, do the following:

#### 6.2.16.1 Before Mopping:

- (1) When sweeping, place movable furniture and fixtures on an area near the door and opposite end where mopping is to



start. Apply masking tape around bottom of file cabinets to prevent water from seeping under them.

#### 6.2.16.2 *Doing the Job:*

(1) Mop as much open area as possible; move heavy desks and tables only enough to mop spot where legs stand.

(2) Return movable furniture and fixtures to mopped area and finish mopping room.

(3) Clean floor under radiators and other hard-to-reach areas with mop in hand.

(4) When the job is complete, the floor should be uniformly clean; there should be no splashes on baseboards or furniture; water should not have been allowed to seep under baseboards, filing cabinets, or other fixed furniture, and no mop strings left on floor.

#### 6.2.16.3 *Before Leaving:*

(1) Return all furniture and fixtures to their original places. Remove masking tape from file cabinets.

(2) If streaks result from returning furniture to original places, go over such streaks with a damp mop.

(3) Close windows and doors and turn out lights.

#### 6.2.16.4 *Care of Equipment:*

(1) Rinse, wring out, and hang mop up to dry.

(2) Clean mop buckets or mop truck.

(3) Return all supplies and equipment to storage.

**6.2.17 Mopping a Corridor.** If floor is unwaxed wood, rubber, vinyl, mastipave, asphalt tile, or linoleum, follow directions in paragraph 6.2.13. If floor is terrazzo, mosaic tile, ceramic tile, slate, or marble, follow directions in paragraph 6.2.14. If floor is waxed, follow directions in paragraph 6.2.15. In addition, do the following:

#### 6.2.17.1 *Before Mopping:*

(1) Thoroughly sweep floors.

(2) Place mop truck or bucket about 15 feet from end of corridor where mopping is to start.

#### 6.2.17.2 *Doing the Job:*

(1) Draw mop along wall at edge of baseboard at end of hall and 15 feet down either side. (fig. 35)

(2) Stand in center of corridor facing wall, mop with wide strokes as shown in illustration. Do not strike wall or baseboard with mop.

(3) Complete area about 15 feet long following directions for doing the job in paragraphs 6.2.13, 6.2.14, or 6.2.15.

(4) Move pails another 15 feet down corridor and repeat process until entire corridor is mopped.

(5) When the job is complete, the corridor should be uniformly cleaned. There should be no mop strings on floor. Water should not have been allowed to splash baseboards or seep under them. There should be no water remaining on floor.

#### 6.2.17.3 *Care of Equipment:*

(1) Rinse out mops, wring them, and hang them up to dry.

(2) Rinse out mop buckets or mop truck.

(3) Return all supplies and equipment to storage.

### 6.2.18 Mopping a Theater or Auditorium.

#### 6.2.18.1 *Equipment Needed:*

(1) Two cotton or linen slasher mops.

(2) Two mop buckets with wringers or squeezers, or two-tank mop truck.

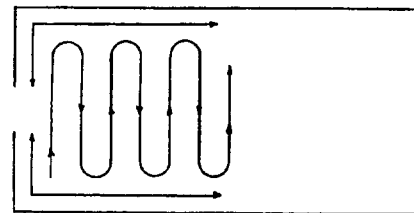
(3) Putty knife.

(4) Dry cloth.

#### 6.2.18.2 *Materials Needed:*

(1) Warm water.

(2) All-purpose synthetic detergent.



**Figure 35. Corridor Mopping Pattern.**

### 6.2.18.3 *Before Mopping:*

- (1) Thoroughly sweep floor.
- (2) Mix detergent solution in one bucket or one tank of mop truck. Use ½ to ¾ cup all-purpose synthetic detergent to every 3 gallons of warm water depending on the degree of soil to be removed. Fill other bucket or tank with clear, warm water.
- (3) Place buckets or mop truck at point “MT” (see figure 33); keep mops in buckets or tanks when not in use.

### 6.2.18.4 *Doing the Job:*

- (1) Take mop from solution; wring out enough so it will not drip, and starting at point “X” (fig. 33) draw mop along floor near baseboard to a point just past aisle three.
- (2) Return to point “X” and draw mop along baseboard to a point opposite entrance of rows 9 and 10.
- (3) Face side wall from point “X” and using long, sweeping strokes, mop area behind seats to point beyond aisle three.
  - (a) Do not splash baseboards or seats.
  - (b) Reach as much of area underneath seats as possible.
  - (c) Do not leave water standing on the floor.
- (4) Mop down aisle three to a point near entrance between rows eight and nine.
- (5) Enter between rows nine and ten and mop under row ten, and as far under seats of row nine as possible.
- (6) Mop aisle four to point of entrance between rows eight and nine.
- (7) Take mop from rinse water; wring and rinse area mopped.
- (8) Rinse mop; wring as dry as possible and dry mop area.
- (9) Take mop from soap solution; wring and mop between rows eight and nine.
- (10) Repeat process until all of section C is mopped.
- (11) Place mop buckets or truck at head of aisle three and mop section B in similar manner to section C. Repeat process for section A.

(12) Change detergent solution and rinse water often.

(13) The floor should be evenly clean; there should be no water standing on floor; no strings should be left on floor.

6.2.18.5 *Before Leaving.* Close doors and windows, and turn out light.

### 6.2.18.6 *Care of Equipment:*

- (1) Rinse, wring, and hang mops to dry.
- (2) Rinse out buckets or tanks of mop truck.
- (3) Return all supplies and equipment to storage.

## 6.2.19 **Mopping Stairs.**

### 6.2.19.1 *Equipment Needed:*

- (1) Two mops.
- (2) Two mop buckets with wringers or squeezers, or a two tank mop truck.
- (3) Putty knife.
- (4) Dry cloth.
- (5) Rubber gloves.

### 6.2.19.2 *Materials Needed:*

- (1) Warm water.
- (2) All-purpose synthetic detergent.

### 6.2.19.3 *Before Mopping:*

- (1) Thoroughly sweep steps and landings.
- (2) Put warm water in buckets or tanks (use only enough to do the job). Add detergent in proportion of 1/2 to ¾ cup detergent per 3 gallons of water depending on degree of soil. Mix thoroughly.
- (3) Place mop buckets or mop truck at foot of stairs in such a way that it will not be a hazard.

### 6.2.19.4 *Doing the Job:*

- (1) Take mop from solution bucket or tank; wring out so it will not drip.
- (2) Mop top landing and stairs and landings down to bottom landing. Use mop strands in the hand to remove dirt from stair corners, and to remove stubborn spots.
- (3) Rinse mop in solution; wring out as dry as possible and repeating step (2) pick up as much solution as possible.

(4) Take rinse mop; wring out so it will not drip, and rinse stairs.

(5) If stairs has balusters, take end of mop in hand and clean around uprights and newel.

(6) When the job is completed, stairs should be evenly clean; there should be no water standing on floor. No water should have seeped between step and riser. There should be no mop strings left on floor. Stair corners, dados, and balusters should be clean.

#### 6.2.19.5 *Care of Equipment:*

(1) Rinse, wring, and hang mops out to dry.

(2) Rinse out mop buckets or mop truck.

(3) Return all supplies and equipment to storage.

**6.2.20 Dry Maintenance Wood Floors, Asphalt Tile and Other Resilient Floors.** This procedure is not recommended for pine or fir floors which have not been sealed, or for splintered floors:

#### 6.2.20.1 *Equipment Needed:*

(1) Electric buffing machine, disk type.

(2) Tampico (light-colored) polishing brush or synthetic polishing pads.

(3) Lambswool pad—to be used only where a high luster is required.

#### 6.2.20.2 *Materials Needed:* None.

#### 6.2.20.3 *Before Buffing:*

(1) Make sure wax is thoroughly dry.

(2) Turn machine on side and attach brush. Tighten securely.

(3) Before plugging cord into outlet, make sure switch is in “off” position. Machine plugged in with switch “on” may whirl handle around, causing damage to machine, personnel, or to furnishings in room.

#### 6.2.20.4 *Doing the Job:*

(1) Move machine on its wheels to starting point, raise wheels, grasp handle with both hands, hold machine level, and turn switch to “on” position.

(2) To move machine to right, raise handle slightly.

(3) To move machine to left, lower handle slightly.

(4) With brush flat on floor and handle in neutral position, machine remains in one position.

(5) To go forward, put slight pressure on left handle; to go backwards, put slight pressure on right handle.

(6) Practice in open part of room until control is mastered.

(7) Always hold handle securely while machine is in operation.

(8) Buff in uniform arcs at even speed.

(9) Area should have uniform sheen. Lambswool pad will remove swirl marks and produce a high luster.

#### 6.2.20.5 *Care of Equipment:*

(1) Turn machine on side and remove brush. (Remove brush when machine is not in use.)

(2) Turn wheels down, wind cord loosely on hooks provided.

(3) Wipe machine clean with cloth.

(4) Return machine to storage place and hang brush on nail.

### 6.2.21 **Operating Automatic Floor Scrubbing Machine.**

#### 6.2.21.1 *Equipment Needed:*

(1) Self-propelled floor scrubbing machine.

(2) Bassine scrubbing brush or synthetic scrubbing pad.

(3) Battery hydrometer.

(4) Battery charger.

#### 6.2.21.2 *Materials Needed:*

(1) Warm water.

(2) All purpose synthetic detergent or wax remover.

#### 6.2.21.3 *Before Scrubbing:*

(1) Check battery water for proper level.

(2) Install brushes.

(3) Remove charger plug and close battery cover.

(4) Be sure dirty water tank is drained and clean.

(5) Check clean-out door and drain valve and tighten if necessary for a good seal. An open drain valve will cause poor water pick up.

(6) Fill solution tank with cleaner in the proportion recommended. Thick syrup like compounds should be pre-mixed and poured into the solution tank.

(7) Sweep floor thoroughly before scrubbing.

#### 6.2.21.4 *Doing the Job:*

(1) Move the machine to starting point, turn switch to “on” position and lower brushes.

(2) Adjust water feed control. Use a minimum flow for economical operation.

(3) Forward speed should be reduced when working next to walls and corners. Water feed should be closed a few feet before turns.

(4) For heavily soiled areas or wax removal, several passes may be required to give the chemical action of the solution a chance to work.

(5) Always drain the dirty water before refilling. Remove sludge from dirty water tank after every drain.

(6) Scrubbing corners—scrub into corner and back the machine out. Use a short handle hand squeegee and pull solution into a path where the machine squeegee will pick it up.

#### 6.2.21.5 *Care of Equipment:*

(1) Use hydrometer to check specific gravity of battery cells.

(2) Check water in the battery at least every week and add when necessary.

(3) Keep pick-up hose and pipe free of debris.

(4) Check vacuum unit periodically to be certain exhaust vents are not plugged.

(5) Replace squeegee rubber when wiping edge becomes rounded.

(6) Wipe machine with a soft cloth to remove dust, dirt or old wax.

(7) Assign one individual to be in charge of lubrication. Areas surrounding lubricated parts should be kept clean of foreign material.

#### 6.2.21.6 *Buffing Operations:*

(1) Machines equipped with a dry-pick vacuum may be utilized to buff large open areas.

(2) Use polishing brushes or fine synthetic polishing pads.

(3) On any dry operation a cloth filter must be used in the vacuum unit.

### 6.2.22 **Stripping Wax From Asphalt, Rubber Linoleum, Mastipave, and Vinyl Floor Coverings.**

#### 6.2.22.1 *Equipment Needed:*

(1) Two clean mops.

(2) Two mop-buckets with wringers or two-tank mop truck.

#### 6.2.22.2 *Materials Needed:*

(1) Warm water.

(2) Wax remover.

#### 6.2.22.3 *Before Doing the Job:*

(1) Fill buckets or tanks about 2/8 full with warm water and add wax remover according to manufacturer’s instructions and mix thoroughly.

(2) Have floor well swept.

(3) Place equipment about 15 feet from corner or end of room farthest from entrance; wet floor where buckets or tanks will stand to prevent marking. Keep mope in buckets or tanks when not in use.

6.2.22.4 *Follow steps under “Doing the Job” in paragraph 6.2.13 for applying stripping solution and mop rinsing.* Allow solution ample time to loosen wax before rinsing. If the floor is extremely dirty or has several layers of wax, use of a disk-type floor machine with a palmetto brush or synthetic scrubbing pad may be necessary to loosen dirt and wax.

6.2.22.5 *After wax has been stripped from the floor.* The floor should be clean, uniform in appearance, and free of streaks and standing water.

## 6.2.23 Applying Water Emulsion Wax.

### 6.2.23.1 Equipment Needed:

- (1) Shallow pan.
- (2) Lambswool Applicator or,
  - (a) Clean mop.
  - (b) Mop bucket with wringer or squeezer.

6.2.23.2 *Materials Needed:* Water emulsion wax.

### 6.2.23.3 Before Waxing:

- (1) Floor should be thoroughly mopped and dry.
- (2) Pan should be clean.
- (3) Mop should be rinsed carefully to remove any traces of detergent.

### 6.2.23.4 Doing the Job:

(1) Keep wax at least 6 inches from walls, filing cases, etc., except for first coat. Buffing machine will carry over enough wax to protect these areas. This prevents wax from building up along edges of walls and fixtures.

(2) Pour water emulsion wax to depth of ½ inch in pan, dip applicator, and wipe surplus off on rim of pan.

(3) Apply wax to floor in long, straight strokes over an area about six feet square. Apply first in one direction and then at right angles to first application to insure entire area is covered.

(a) A thin, even coat is best for safety and service.

(b) Do not rub wax during drying.

(4) Continue steps (1) and (2) until entire surface to be waxed is covered.

(5) If mop is used to apply wax, dip in clear, cold water and wring out as dry as possible.

(6) After pouring wax in bucket, dip mop and wring it out until it is only damp.

(7) Apply wax to floor in the same manner as in damp mopping.

(8) Apply in areas about six feet square, in one direction and then the other. Continue until entire floor is covered.

(9) Wax should be thinly and evenly

applied; there should be no dry places or spots waxed excessively.

### 6.2.23.5 Drying Wax:

(1) See that air circulation is good and room is warm, or wax will be slow to dry.

### 6.2.23.6 Care of Equipment:

(1) Wash applicator or mop in soapy water, rinse in clear water. Hang mop up to dry or, if lambskin is used, spread lambskin out on smooth surface to dry.

(2) Dispose of leftover wax.

(3) Wash mop pail or pan.

(4) Return all supplies and equipment to storage.

## 6.2.24 Buffing an Open Room or Corridor.

### 6.2.24.1 Equipment Needed:

(1) Disk-type electric buffing machine.

(2) Tampico brush (light-colored fibers), or synthetic polishing pad.

(3) Lambswool pad if high luster is required.

6.2.24.2 *Materials Needed:* None.

6.2.24.3 *Before Buffing.* Follow instructions for "Before Buffing" in paragraph 6.2.20.

6.2.24.4 *Doing the Job.* Operating directions for disk-type machine are found in paragraph 6.2.20, fig. 36.

(1) Run machine on wheels to starting point. (Starting point will vary with location of electric outlet.)

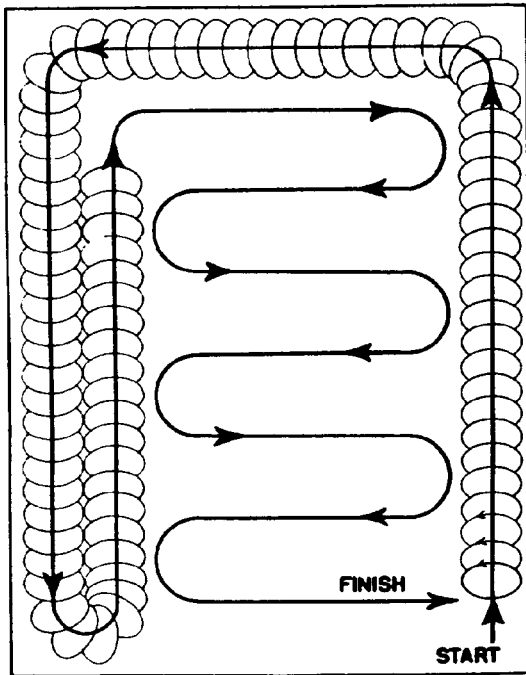
(2) Buff strip at base of wall. This will eliminate swinging machine into wall as main floor is buffed.

(3) Stand at one end of room about four feet from wall, facing wall, and buff in wide arcs (about six feet).

(4) As each arc is completed, step back a distance equal to disk width and continue until within six feet of opposite wall.

(5) Turn, face wall, and buff remaining area.

(6) Continue buffing room in strips of about six feet until entire room is buffed.



**Figure 36. Buffing an Open Room Pattern.**

6.2.24.5 *When job is completed.* The floor should be uniformly buffed. There should be no heavy swirl marks.

6.2.24.6 *Care of Equipment.* See “Care of Equipment,” paragraph 6.2.20.

**6.2.25 Wall Washing—Hand Method.** Two operators are required for this work. One man should wash the lower half of wall while other washes upper half. Man washing lower half should wash an area about eight feet long and half way up wall before the upper half is started. The method of cleaning outlined below does a minimum of damage to painted surfaces. Stronger agents may be desirable for faster cleaning prior to painting.

**6.2.25.1 Equipment Needed:**

- (1) Two 14-quart buckets per man.
- (2) Two large natural sponges or two large cellulose sponges per man.
- (3) Several large, dry, clean cloths.
- (4) Platform ladder or two ladders and a plank.

**6.2.25.2 Materials Needed:**

- (1) All-purpose synthetic detergent
- (2) Warm water.

**6.2.25.3 Before Washing Walls:**

- (1) Move furniture away from walls.
- (2) Remove pictures, shades, or other furnishings which would interfere with the operation.

(3) See that walls and woodwork are thoroughly dusted (paragraphs 6.2.28 and 6.2.29).

(4) Fill bucket about 3/4 full of warm water; mix thoroughly in one bucket, 1/2 to 3/4 cup of all-purpose synthetic detergent as required to remove dirt.

(5) Put sponges in buckets and place buckets on paper (to prevent rings on floor) where work is to start.

**6.2.25.4 Doing the Job:**

(1) Take sponge from solution and squeeze, do not wring, until sponge does not drip. Wringing will tear sponge and soon destroy it.

(2) Start in corner using long, straight strokes. If baseboard is painted, wash it also.

(3) Continue until an area about four feet wide and halfway to ceiling is washed.

(4) Take sponge from rinse water, squeeze until it does not drip, and rinse area starting from the bottom and working up. Rinse sponge often.

(5) Rinse sponge in rinse water and squeeze as dry as possible. Dry area as much as possible. Use straight strokes only.

(6) Repeat steps (1) through (5) until entire lower half of wall has been cleaned.

(a) Clean woodwork on windows and doors as readied in operation.

(b) Change water often.

(7) When a width of about eight feet of lower wall has been washed, the second man can start washing the upper half. Set ladders at corner where washing of lower wall has been completed, placing pails on platform or plank set between two ladders. Be sure ladders and plank are safe to use.

(8) Start work at point in corner where washing of lower half stopped and

wash upward, using long, straight strokes. Follow same procedure as for washing lower half of wall (steps (1) through (5)).

(a) Do not allow water to run over on wall which has not been washed. This forms streaks that are difficult to remove.

(b) Do not allow water to run down on lower half of washed wall.

(9) Move platform ladder or ladders and planks as necessary and repeat until entire wall is washed.

(10) Wall should have no streaks and no smudge mark at point where cleaned upper and lower halves meet. There should be no water spilled on floors or furnishings.

#### 6.2.25.6 *Care of Equipment:*

(1) Rinse out sponges and buckets.

(2) Return all supplies and equipment to storage.

### 6.2.26 **Washing Woodwork.**

#### 6.2.26.1 *Equipment Needed:*

(1) Two 14-quart buckets.

(2) Two natural or cellulose sponges.

(3) Several clean, dry cloths.

#### 6.2.26.2 *Materials Needed:*

(1) All-purpose synthetic detergent.

(2) Warm water.

#### 6.2.26.3 *Before Washing:*

(1) See that dust is removed from window sills, above doors, or any other area where it will interfere with washing.

(2) Remove any shades, pictures, or other furnishings which will interfere with the work.

(3) Fill buckets about 3/4 full of warm water. Mix approximately 1/2 cup detergent in one bucket. Put sponges in buckets. Place buckets on heavy paper (to prevent water rings) near point where work is to start.

#### 6.2.26.4 *Doing the Job:*

(1) Take sponge from solution, squeeze, do not wring, until it will not drip.

(2) Start at bottom of door, door casing, or window frame and wash upward,

using long, straight strokes. Do not spill water on walls or floor.

(3) When lower half of door or window has been washed, take rinsing sponge and squeeze out so it will not drip. Go over entire washed area.

(4) Rinse sponge, squeeze out as dry as possible, and go over washed area to pick up as much water as possible.

(5) Wipe area with clean dry cloth.

(6) Clean upper half of window or door following steps (1) through (5).

(7) Properly washed woodwork should be uniformly clean. There should be no dirt in corners or grooves of wood moldings. There should be no spots on walls or floors from spilled solution or wet sponge.

### 6.2.27 **Wall Washing—Machine Method.**

#### 6.2.27.1 *Equipment Needed:*

(1) Wall washing machine, fig. 10.

(2) Ladders and scaffolding.

(3) 14-quart bucket.

#### 6.2.27.2 *Materials Needed:*

(1) Terrycloth pads.

(2) All-purpose synthetic detergent or good commercial wall cleaner, as recommended by manufacturer of machine.

(3) Warm water.

#### 6.2.27.3 *Before Washing:*

(1) Pour about a gallon of warm water in bucket.

(2) Mix 1/4 cup of detergent per gallon of water. If commercial cleaner is used, follow manufacturer's instructions.

(3) Test cleaner on wall to be washed. Use piece of cloth dipped in solution. If too strong, dilute solution with warm water. If too weak, add more cleaner until solution cleans without removing paint or burning wall.

(4) Check reading of pressure gage on rinse tank. If there is pressure in tanks, release air.

(5) Remove pump from solution tank and pour in one gallon of cleaning solution. If commercial cleaner is used and further di-

lution is necessary, follow manufacturer's instructions.

- (6) Fill rinse tank half full.
- (7) Close air release valve and pump between 15 and 20 pounds pressure.
- (8) Fold terrycloth lengthwise, then crosswise, and attach to trowels. Cover all trowels. See that cloth is stretched evenly.
- (9) Allow enough liquid to flow on wash and rinse cloths to dampen them thoroughly.
- (10) Prepare room for wall washing as described in paragraph 6.2.25.

#### 6.2.27.4 *Doing the Job:*

(1) Man applying washing solution holds trowel flat against wall and moves it with light pressure in long, straight, up and down strokes beginning at lower part of wall. Do not allow enough solution on pad to cause dripping.

(2) As soon as man with washing solution trowel has covered an area about eight feet square, man with rinse goes over area, using long, straight, up and down strokes.

(3) As soon as he has rinsed the wall, the second man then goes over the area with the drying trowel or a dry cloth.

(4) When washing solution pad becomes soiled, turn, and use again. When dirty again, remove, place rinse pad on washing trowel, drying pad (if machine is so equipped) on rinse trowel, and fresh pad on drying trowel.

(5) Proceed, washing wall in same manner as described in paragraph 5.2.25. Same precautions should be taken about streaking.

(a) If there are marks on wall caused by chairs, etc., wash these after wall is cleaned in order to avoid lap marks.

(b) When woodwork is reached, wash with cloth or sponge as described in paragraph 6.2.26.

(c) When rinsing, stay within area washed with washing trowel. This tends to eliminate lap marks.

(6) A properly washed wall should be uniformly clean. There should be no water on floor or fixtures. Woodwork should be clean.

#### 6.2.27.5 *Care of Equipment:*

- (1) Open air valve and release pressure from tanks.
- (2) Empty machine and rinse with clear water.
- (3) Remove pads, wash, hang to dry.
- (4) Drain hose, wind loosely on trowels, hang trowels on hooks on machine.
- (5) Wipe machine with clean, damp cloth.
- (6) Return all supplies and equipment to storage.

### 6.2.28 High Dusting.

#### 6.2.28.1 *Equipment Needed:*

- (1) Six by ten-inch treated yarn duster with five foot handle.
- (2) Several treated dustcloths.
- (3) Clean untreated cotton cloths.
- (4) Curved six by ten inch treated yarn duster with six-foot handle for dusting top of pipes.
- (5) Eighteen-inch floor brush with long handle.
- (6) Safety pins.
- (7) Platform-type ladder.
- (8) Counter brush.
- (9) Dustpan and dustbox.

#### 6.2.28.2 *Materials Needed:* None.

#### 6.2.28.3 *Before Dusting:*

(1) Place ladder near entrance of room, and place small dusting tools on platform.

(2) Place dustbox in convenient place.

(3) Fold clean, untreated cotton cloth over bristles of floor brush and pin securely with safety pins.

#### 6.2.28.4 *Doing the Job:*

(1) Sweep ceiling with floor brush, starting in corner, using long straight strokes. Do not rub; brush lightly.

(a) Turn dustcloth as it becomes soiled. Replace as often as necessary.

(b) Do not dust when relative humidity is high, as this may cause streaks.



(2) Sweep walls with floor brush. Start at ceiling and sweep with one stroke to baseboard. Observe instructions d(1) (a) and (1) (b) above.

(3) Climb ladder and dust woodwork lightly with treated yarn duster or treated dustcloth.

(a) If dust accumulation on moldings, etc., is too heavy to be removed by duster or cloth, use counter brush and dustpan first.

(b) Do not touch walls with treated dusters or treated dustcloths. This leaves spots difficult to remove.

(4) Use curved yarn duster over pipes, and draw lightly along top of pipe. Follow steps (3) (a) and (3) (b) if necessary.

(5) Shake dusters and dustcloths into dustbox as necessary.

(6) A properly dusted area should show no smudges and no oil spots from treated dusters. Moldings and pipes should be free from dust.

#### *6.2.28.5 Before Leaving:*

(1) Replace all furniture and fixtures, shades or pictures moved before dusting.

(2) Close windows, turn out lights, and close door.

#### *6.2.28.6 Care of Equipment:*

(1) Wash and treat soiled dusters as described in paragraphs 6.2.1 and 6.2.2.

(2) Return all supplies and equipment to storage.

### **6.2.29 Dusting Woodwork—Low Dusting.**

#### *6.2.29.1 Equipment Needed:*

(1) Untreated dustcloth or untreated hand duster.

(2) Putty knife.

#### *6.2.29.2 Materials Needed: None.*

#### *6.2.29.3 Doing the Job:*

(1) Start dusting at entrance of room. Dust lightly. Dust surfaces of doors, door frames, window ledges or sills, wainscoting baseboards, etc.

(a) Avoid touching walls with treated dusters or dustcloths.

(b) If dustcloth is used, hold lightly. Do not flick dustcloth as this scatters dust around room.

(2) Refold dustcloth as necessary to provide a clean surface as work proceeds. Change cloths as often as necessary.

(3) Remove gum with putty knife.

(4) Properly dusted woodwork should appear bright. Dust should be removed; not scattered around room. There should be no smudge marks on walls.

#### *6.2.29.4 Before Leaving:*

(1) Replace furniture or other articles moved in the course of dusting.

(2) Turn out lights, close doors.

#### *6.2.29.5 Care of Equipment:*

(1) Return dusters and dustcloths to storage places.

(2) Wash soiled dusters or dustcloths.

### **6.2.30 Dusting Office Furniture.**

#### *6.2.30.1 Equipment Needed:*

(1) Treated hand duster.

(2) Treated dustcloths.

#### *6.2.30.2 Materials Needed: None.*

#### *6.2.30.3 Doing the Job:*

(1) Apply duster or cloth lightly to surface of tables or desks, moving in long straight strokes.

(a) Do not flick duster or dustcloth over surfaces, as this only scatters the dust.

(b) If cloth is used, hold lightly to absorb dust easily.

(2) Lift letter trays, books, ink stands, etc., and dust under them.

(a) Do not disturb papers left on desk.

(b) Do not dust typewriters, adding machines, or similar equipment.

(3) Wipe legs, rungs, and other parts of furniture as reached in course of dusting.

(4) Reverse cloth to present clean surface for dusting, and change cloth as often as necessary.

(5) A properly dusted office should appear clean and orderly. There should be no

dust streaks. All chair legs and rungs should be free from dust. There should be no oily areas on surfaces.

#### 6.2.30.4 *Before Leaving:*

- (1) Replace furniture or other articles moved in course of dusting.
- (2) Turn off lights and close doors.

#### 6.2.30.5 *Care of Equipment:*

- (1) Return clean dusters or cloths to storage.
- (2) Wash dirty cloths or dusters in accordance with paragraphs 6.2.1 and 6.2.2.

### 6.2.3.1 **Washing Windows.**

#### 6.2.31.1 *Equipment Needed:*

- (1) Clean cloths.
- (2) Bucket.
- (3) Safety belt (if building is equipped for its use, and windows are higher than eight feet above ground or roof).
- (4) Sill pad.
- (5) Counter brush.
- (6) Natural or cellulose sponge and squeegee.
- (7) Platform ladder.

6.2.31.2 *Materials Needed:* Clear water (change frequently). If windows are very dirty, use glass cleaner according to manufacturers recommendations.

#### 6.2.31.3 *Doing the Job:*

##### (1) *Windows Equipped for Safety Belt:*

- (a) Put on and adjust safety belt. (Belt should be inspected by supervisor before being used.)
- (b) Place sill pad on window sill, bucket on floor (not furniture) near window, wet sponge, and squeeze out so it does not drip.
- (c) Raise lower sash of window, hook one side of safety belt to safety hook.
- (d) Stand on inner sill and test security of belt and hook by pulling on the belt.
- (e) Step out on sill, hook other side of belt and test again.
- (f) Dust surface and frame of window with counter brush.

(g) Wash upper sash glass, using long straight strokes from side to side, then up and down.

(h) Dry glass with clean dry cloth or squeegee.

(i) Push down upper sash and wash lower sash in same manner. If upper sash cannot be pushed down, pull lower sash all the way down and wash it.

(j) Raise sash, unhook one side of safety belt and step into room. Do not unhook other side of belt until safely into room.

(k) Wash inside of window, standing on sill pad or ladder.

(l) Remove sill pad, close window, and wipe up any spilled water.

(m) Pick up equipment and move to next window. Never pass from one window to another on outside of building.

##### (2) *Washing Windows Without Use of Safety Belt:*

(a) Place pad on sill, raise lower sash, and sit on outer sill, holding legs firmly over inner sill.

(b) Pull down upper sash and wash as described above.

(c) Raise upper sash, pull down lower sash and wash as much as possible.

(d) Raise sash and pull self into room without releasing leglock on inner sill.

(e) Stand on sill pad and wash inner side of window.

(f) Push upper sash all the way down, raise lower sash enough to permit washing remainder of outer side of glass in lower sash.

(g) Remove sill pad, close window, clean up any spilled water.

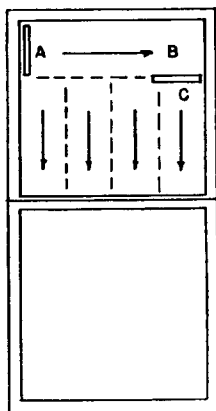
(h) Move equipment and proceed to next window.

##### (3) *Use of Squeegee on Large Windows:*

(a) Wash window as in (1) (g) above.

(b) Start squeegee at top left-hand corner of glass and draw it horizontally toward right (from "A" to "B" in figure 37).

(c) Wipe squeegee blade with clean cloth. Start at point "C" in illustration and



**Figure 37. Window Washing Pattern.**

draw squeegee to bottom of glass. Repeat until entire window is dried.

(d) Use cloth to wipe up water gathered by squeegee.

(e) Properly cleaned windows should be bright and without streaks. There should be no water on sill. Water should not have been allowed to run down either inside or outside wall.

#### 6.2.31.4 Care of Equipment:

(1) Rinse out cloths and hang them up to dry.

(2) Wipe squeegee blade and place so it will not lose its shape.

(3) Return all supplies and equipment to proper storage.

6.2.31.5 *Special Types of Windows.* In buildings equipped with casement, or pivoted type windows, cleaning of outside glass is usually done from the inside by opening window and leaning through opening. Care should be maintained to keep greater part of body within room and maintain firm grip with free hand. Exterior of fixed windows can be cleaned with the aid of a ladder if no higher than two stories from the ground or adjacent roof.

### 6.2.32 Cleaning Toilets and Urinals.

#### 6.2.32.1 Equipment Needed:

- (1) Small bucket.
- (2) Clean sponges.

(3) Toilet bowl mop.

(4) Rubber gloves.

#### 6.2.32.2 Materials Needed:

(1) All-purpose synthetic detergent or trisodium phosphate.

(In hard water areas.)

(2) Warm water.

6.2.32.3 *Before Washing.* Place enough detergent or trisodium phosphate in about ½ gallon of warm water to make mild cleaning solution. Use trisodium phosphate for heavy deposits only.

#### 6.2.32.4 Doing the Job:

(1) *Toilets:*

(a) Flush toilet.

(b) Put on rubber gloves, dampen toilet bowl mop in solution and apply it to entire inner surface of the toilet bowl, fig. 38. The outer surfaces of the toilet bowl, hinge, seat, tank, and floor near the toilet shall be cleaned with a damp sponge and a soft cloth.

(c) Dampen mop again and wash thoroughly under inner edge of toilet bowl.

(d) Reach mop down into trap as far as possible and clean thoroughly.

(e) Rinse surface with damp, clean cloth.

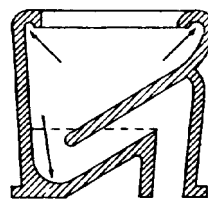
(f) Dry outside of bowl, seat, tank with dry cloth. Flush toilet.

(2) *Urinals:*

(a) Flush urinal.

(b) Put on rubber gloves, wet toilet mop in cleaning solution and apply to inner and outer surface of urinal and floor near urinal. Rub harder on spots where there is any sign of stain or deposit, fig. 39.

(c) Rinse surface with clean damp sponge.



**Figure 38. Toilet Bowl Cleaning.**

### SCRUB INSIDE OF COMMODES AND URINALS



**Figure 39. Toilet Bowl and Urinal Cleaning Mop.**

(d) Dry outside of fixture and metal parts with clean dry cloth.

(e) Flush urinal.

(f) Clean toilets and urinals have no unpleasant odors. Surfaces are bright. There should be no soap streaks, and metal parts should be clean and bright.

(g) If fixtures do not properly flush, report it immediately to your supervisor.

**6.2.32.5 Cleaning and Disinfecting Rubber Gloves.** After each use rubber gloves should be cleaned and 4 disinfected before storage.

(1) Wash in solution of warm water and detergent.

(2) Disinfect in solution of Disinfectant, Germicidal and Fungicidal.

(3) Drain and allow to air dry.

### 6.2.33 Cleaning Washbowls.

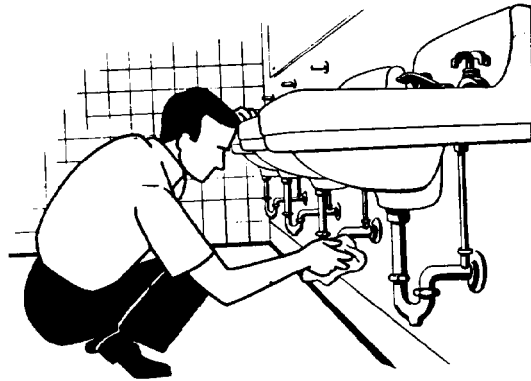
#### 6.2.33.1 Equipment Needed:

- (1) Small bucket.
- (2) Clean sponges.
- (3) Plumbers "Friend."

#### 6.2.33.2 Materials Needed:

- (1) All-purpose synthetic detergent.
- (2) Warm water.

### RINSE BOWLS AND HARDWARE, AND DAMP-WIPE THE WALLS AROUND AND PLUMBING UNDERNEATH



**Figure 40. Wiping Washbowls and Hardware.**

#### 6.2.33.3 Before Cleaning:

(1) Place enough detergent in  $\frac{1}{2}$  gallon of warm water to make a mild cleaning solution.

(2) Remove bars of soap, etc., from lavatory.

#### 6.2.33.4 Doing the Job:

(1) Dampen sponge in cleaning solution and go over surface of bowl and metalware, being careful to rub inside of bowl hard enough to remove any soap deposits. Do not have cloth wet enough to cause water to drip on floor or splash on wall.

(2) Rinse surface with sponge dampened in clear water.

(3) Dry bowl and metal parts with clean dry cloth, fig. 40.

(4) Lavatory should be clean and bright. Metalware should be clean. There should be no water or detergent solution spilled on floor or splashed on wall near back of fixture.

#### 6.2.33.5 Care of Equipment:

(1) Rinse mops and sponges and hang them up to dry. Disinfect rubber gloves.

(2) Clean bucket, return it to storage.

### 6.2.34 Cleaning Drinking Fountain.

#### 6.2.34.1 Equipment Needed:

- (1) Small pail.

- (2) Clean sponges.

#### 6.2.34.2 *Materials Needed:*

- (1) All-purpose synthetic detergent.
- (2) Warm water.

6.2.34.3 *Before Cleaning.* Add enough detergent to about ½ gallon of warm water to make a mild cleaning solution.

#### 6.2.34.4 *Doing the Job:*

- (1) Remove any litter from fountain, such as chewing gum or bits of paper.

- (2) Dampen sponge in washing solution and apply it to the porcelain or china part of fountain, and to metal parts.

- (3) Wring another sponge in clear water and go over surface to remove cleaning solution and dirt.

- (4) Use dry sponge to polish porcelain and metal parts of fountain.

- (5) If fountain is cabinet type, wipe sides with cloth dampened in clear water, and dry with clean dry sponge.

- (6) Rust spots on porcelain may be removed with detergent.

- (7) When job is completed, fountain should be completely clean. Porcelain and metalware should be bright. Water should not be splashed on wall or on floor around fountain.

#### 6.2.34.5 *Care of Equipment:*

- (1) Wash and rinse sponges.

- (2) Rinse bucket and return it to proper storage place.

### 6.2.35 **Cleaning Solid Brassware (Unlacquered).**

6.2.35.1 *Equipment Needed:* None.

#### 6.2.35.2 *Materials Needed:*

- (1) Metal polish.
- (2) Water.
- (3) Two clean cloths.

#### 6.2.35.3 *Doing the Job:*

- (1) Dampen cloth with water and apply small quantity of polish to cloth.

- (2) Rub polish on brass to be cleaned until all tarnish is removed.

- (3) Allow polish to dry.

- (4) Rub with soft clean cloth. If any tarnish remains, repeat steps one to three and rub with cloth again.

- (5) If there is a large quantity brass to be polished, rub polish on all surfaces before rubbing with dry cloth.

- (6) Do not spill polish on floor or fixtures, since brass polish is extremely difficult to remove from these surfaces.

- (7) Properly polished brass should have high luster, showing no dull patches or scratches. There should be no polish spilled on floors or fixtures.

#### 6.2.35.4 *Care of Material:*

- (1) Wash cloths and hang them up to dry.

- (2) Return polish to proper storage place.

### 6.2.36 **Cleaning Light Fixtures.**

#### 6.2.36.1 *Equipment Needed:*

- (1) Safety platform ladder.
- (2) Two 14-quart buckets.
- (3) Clean sponges.
- (4) Counter brush and dustpan.
- (5) Paper towels.

#### 6.2.36.2 *Materials Needed:*

- (1) One bucket of clear water.
- (2) All-purpose synthetic detergent.

#### 6.2.36.3 *Before Cleaning:*

- (1) If lights are arranged so that one-half of them can be turned off at a time, turn off part of them to cool before washing. If all lights operate from one switch, turn them all off. Do not wash any part of light fixture when lamp is lighted. To do so may result in injury or death from electrical shock.

- (2) Divide water between buckets. Place enough detergent in one pail for mild cleaning solution.

#### 6.2.36.4 *Doing the Job:*

- (1) Place ladder at a position convenient to reach fixture; put bucket on platform. Before use, be sure safety ladder is in good condition and has nonslip feet.

- (2) Unhook bowl from fixture.

(3) If parts are very dusty, brush them with counter brush into dustpan.

(4) Wipe metal parts with damp sponge dampened in cleaning solution.

(5) Wipe light bulb with sponge dampened in clear water. Be sure bulb is cool or it may break when cloth is applied.

(6) Dip clean sponge in clear water, wring out until quite dry, and clean both inside and outside of bowl. Dry entire bowl with clean paper towel.

(7) Replace bowl, check to see it is secure. Avoid tightening screws enough to break bowl.

(8) Fixture and bowl should look bright and clean whether light is off or on. Bowl should hang evenly from fixture. Metal supports and other parts should be free from dust.

#### 6.2.36.5 *Care of Equipment:*

(1) Wash sponges.

(2) Wash and rinse buckets.

(3) Return all supplies and equipment to storage places.

### 6.2.37 **Cleaning Chromium and Nickel-Plated Ware.**

#### 6.2.37.1 *Equipment Needed:*

(1) Soft clean cloths.

(2) Good grade metal polish.

#### 6.2.37.2 *Materials Needed.* Water.

#### 6.2.37.3 *Doing the Job:*

(1) *Cleaning Nickel-Plated Ware:*

(a) Dampen cloth and sprinkle lightly with polish.

(b) Rub polish on nickel-plated ware. Allow to dry.

(c) Rub off with clean dry cloth.

(2) *Cleaning Chromium-Plated Ware:*

(a) Wipe with damp cloth. Use synthetic detergent if required.

(b) When dry, rub with soft dry cloth. *Do not* use polish on chromium-plated ware; it does not tarnish, and the plating is so thin that polish soon removes it, leaving an unsightly fixture.

(c) Properly cleaned fixtures should be without soil and bright. No polish should be left on fixtures or floor.

#### 6.2.87.4 *Care of Equipment:*

(1) Wash cloths and hang them up to dry.

(2) Return polish to proper storage space.

### 6.2.38 **Damp Mopping Conductive Floors.**

#### 6.2.38.1 *Equipment Needed:*

(1) Mop.

(2) Mop bucket with wringer or squeezer or mop truck.

#### 6.2.38.2 *Materials Needed.* Clear water.

#### 6.2.38.3 *Before Mopping:*

(1) Be sure mop contains no traces of wax or any cleaning solution. Foreign substances reduce conductivity of the floor.

(2) Thoroughly sweep floor, paragraph 3.1.7.10.)

(3) Place mop bucket or truck about eight feet from wall or corner farthest from entrance.

#### 6.2.38.4 *Doing the Job:*

(1) Take mop from bucket or tank and wring it as dry as possible.

(2) Starting in corner, draw mop along floor at baseboard about eight feet, then along floor at baseboard of adjacent wall about same distance.

(3) Facing wall opposite entrance, move mop in wide strokes from side to side. Do not strike baseboards or furniture. Move back as mopping progresses.

(4) Continue in this manner until entire floor is damp mopped.

(5) Change mop water frequently. Rinse mop frequently. Be sure mop is as dry as possible before applying to floor as too much water will lower or destroy the conductivity of the floor.

(6) A properly mopped floor should dry almost immediately. There should be no water standing on floor. There should be no

streaks on floor. Any mop strings dropped during operation should be removed.

*6.2.38.5 Before Leaving:*

- (1) Clean all equipment thoroughly.
- (2) Turn out lights.

*6.2.38.6 Care of Equipment:*

- (1) Clean all equipment thoroughly.
- (2) Hang up mop to dry.
- (3) Return mop bucket or truck to proper storage space.

## \*CHAPTER 7 CARPET CARE

### Section 1—GENERAL

**7.1.1 Introduction.** This chapter covers the custodial maintenance of carpets used in service facilities, other than medical and industrial facilities.

### Section 2— MAINTENANCE REQUIREMENTS

**7.2.1 Determinants of Maintenance Requirements.** Custodial maintenance for various types and colors of carpet consists of the same basic tasks; however, these tasks must be performed with varying frequencies primarily determined by a) carpet construction and installation, b) types and concentrations of soiling, c) amount of foot traffic, d) the desired level of appearance.

#### 7.2.2 Carpet Construction and Installation.

**7.2.2.1 Color and Pattern.** A light, solid color carpet will show surface soils, litter, and stains more readily than would a mixed color, patterned carpet. Therefore, policing, routine vacuuming, and surface shampooing would have to be scheduled more frequently for the light, solid color carpet.

**7.2.2.2 Construction.** Carpets constructed from natural fibers, such as wool or with natural backing, such as jute, are sensitive to damage from overexposure to liquids during carpet shampooing. Wool carpet may shrink and jute backing may separate. Caution should always be observed when exposing carpet to moisture to minimize the amount of liquid and the length of time the carpet remains damp. Additionally, the effect of the cleaning solution and the shampooing process should be predetermined on a small, obscure area of the carpet.

**7.2.2.3 Carpet with cut pile will shed carpet fibers more readily than would carpet with looped pile during vacuuming with an aggressive carpet vacuum.** Carpet which has a short pile height will require less frequent vacuuming with a heavy-duty pile lifter since routine vacuuming will be more effective in the removal of embedded soil.

**7.2.2.4** Some types of adhesives used to adhere carpet to the floor may be sensitive to moisture.

**7.2.3 Types of Soil.** The following types of soil

deposited on a carpeted area significantly affect the custodial maintenance requirements:

*Surface Soil and Litter* — Soil which remains on or near the surface of the carpet, such as paper clips, rubber bands, small bits of paper, loose dry dirt, etc.

*Embedded or Sticky Soil* — Soil which becomes embedded or adheres to the carpet fibers, such as embedded grit, soluble or wet soil, such as mud, airborne oily soil, etc., and sticky substances, such as gum, asphalt, waxes, etc.

*Stains* — Substances which penetrate the basic carpet fiber, such as ink, blood, iodine, etc.

**7.2.4 Soiling.** The amount of foot traffic in a carpeted area will largely determine the volume of soil and the damage caused by that soil. For the purpose of establishing maintenance task frequencies, the following classifications are helpful.

*Public, trafficked areas* are areas which are subject to heavy foot traffic and large volumes of soil, such as entrances, areas in front of elevators, main corridors on entry levels, lobbies in front of rest rooms, dining areas, etc.

*Secondary areas* are areas which are not used by a large number of people or are not subject to a large amount of foot traffic. By the time people reach these areas, most of the dirt brought in on their shoes has been “walked off”. Secondary areas are generally private offices, spaces far removed from entrances, or on upper floors.

*Optional areas* are areas which receive little foot traffic or soil, and are not normally occupied or seen by the general population of the building. This includes areas such as file rooms, very low use private offices, etc.

**7.2.5 Desired Level of Maintenance.** The level of maintenance to be provided a carpeted area is usually subject to budgetary constraints. The



selection of carpet maintenance tasks and task frequencies should be based on the benefits resulting from the performance of the tasks. The following priority ranking should be used as a guideline in selecting a carpet maintenance program.

*Priority #1* — Those tasks which must be performed to insure a safe, healthy environment. An example of such a task would be the daily routine vacuuming of carpet in dining facilities to prevent the accumulation of food which provides a medium for bacteria growth.

*Priority #2* — Those tasks which must be performed in order for the occupants of the area to complete their assigned mission. An example of such a task would be the frequent vacuuming of an electronic data processing area to control the level of dust within the area, since high concentrations of dust would

interfere with the operation of the data processing equipment.

*Priority #3* — Those tasks which, if performed, would economically justify their performance. An example of such a task would be monthly vacuuming with a heavy-duty pile lifter vacuum to remove embedded grit. If the grit were not removed on a frequent basis then its sharp cutting edges would significantly reduce the expected life of the carpet.

*Priority #4* — Those tasks which contribute only to the appearance of an area. An example of such a task would be the frequent routine vacuuming of low trafficked areas to remove surface soil.

**7.2.6 Guidelines for Establishing Custodial Maintenance Task Frequencies.**

|                     | PUBLIC<br>TRAFFICKED<br>AREAS | SECONDARY<br>AREAS | OPTIONAL<br>AREAS |
|---------------------|-------------------------------|--------------------|-------------------|
| POLICING            | -                             | DAILY              | WEEKLY            |
| ROUTINE VACUUMING   | DAILY                         | WEEKLY             | MONTHLY           |
| STAIN REMOVAL       | UPON DISCOVERY                | UPON DISCOVERY     | UPON DISCOVERY    |
| HEAVY DUTY VACUUM   | MONTHLY                       | QUARTERLY          | YEARLY            |
| SURFACE SHAMPOOING  | QUARTERLY                     | TWICE PER YEAR     | YEARLY            |
| EXTRACTION CLEANING | YEARLY                        | EVERY TWO YEARS    | EVERY THREE YEARS |

**Figure 41. Guidelines for Carpet Maintenance Frequencies.**

**Section 3 — MAINTENANCE TASKS**

**7.3.1 Definitions of Tasks.** The following procedures or tasks are normally adequate for all types of carpet.

*7.3.1.1* Policing involves the removal of dry litter, such as paper clips, rubber bands, gum, etc., and unsightly concentrations of dry dirt and grit. Policing is normally performed in areas where it is important to maintain an acceptable appearance between routine vacuumings or to

prepare an area for vacuuming by removing objects which should not be ingested into a vacuum cleaner.

*7.3.1.2* Routine vacuuming involves the removal of surface soil and a certain amount of embedded grit from between carpet fibers. Routine vacuuming is only accomplished by the use of a carpet vacuum with a rotating agitator brush.



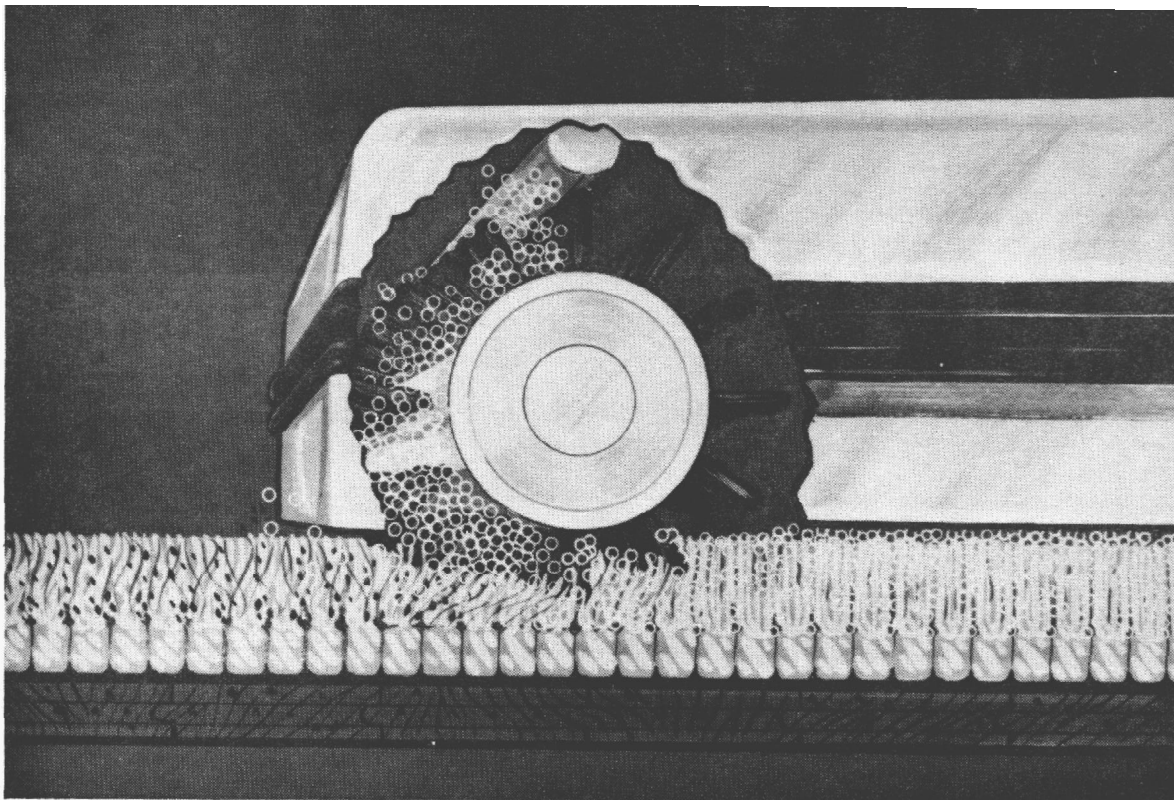
**Figure 42. Routine Vacuuming.**

7.3.1.3 Stain removal involves the treatment of stains and other discolorations on an as-needed basis. This removal is accomplished by a variety of methods and combinations of methods and is most easily performed before the stain has dried or "set".

7.3.1.4 Heavy-duty vacuuming involves the use of a very aggressive vacuum and agitating brush to remove deeply embedded soil and grit, and to aid in restoring the lost resiliency of the carpet pile caused by foot traffic.

7.3.1.5 Surface shampooing involves the removal of discolorations and soil adhering to carpet fibers on or near the surface of the carpet. It involves the application of a foam generated within the shampooer (rather than a liquid) and is accomplished with a dry foam shampooer.

7.3.1.6 Extraction cleaning is the most thorough method of carpet cleaning and removes not only surface soils and stains but also embedded soils and residues from the dry foam shampooing method. Extraction cleaning in-



**Figure 43. Dry Foam Shampooing Process.**

volves the combined application of a highly-atomized water detergent solution and the immediate vacuuming of the residue solution from the carpet. Under most conditions, a carpet maintenance program should provide one extraction cleaning for every three surface shampooing.

7.3.1.7 There are additional methods of carpet shampooing; however, in most situations, these methods may cause excessive damage to

the carpet, may be too costly, or are not as effective as a combination of the dry foam and water methods.

7.3.1.8 The repair of damaged carpet is generally a specialized function requiring techniques, skills, materials, and tools not normally available to the custodial workforce. However, damaged carpet can be a hindrance to effective custodial carpet maintenance and should be reported upon discovery.

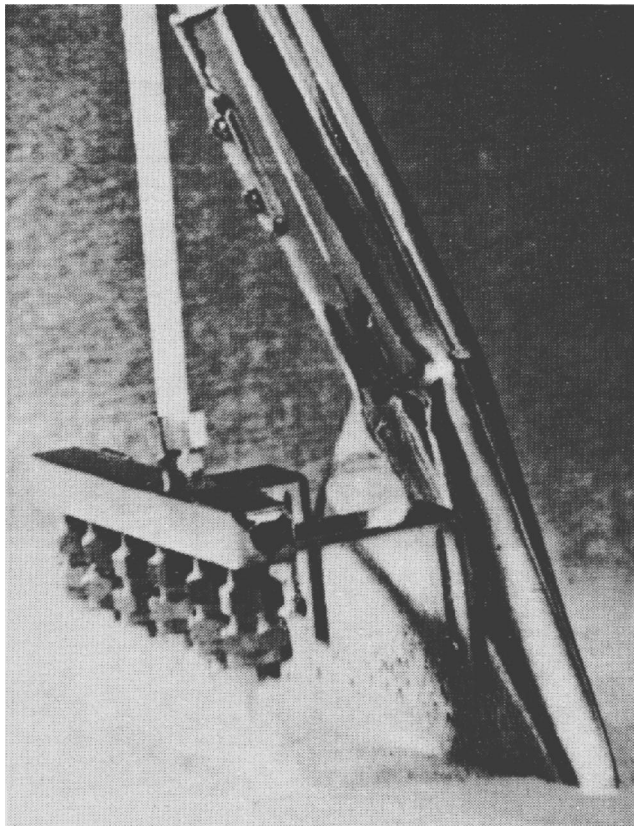


Figure 44. Water Extraction Cleaning.

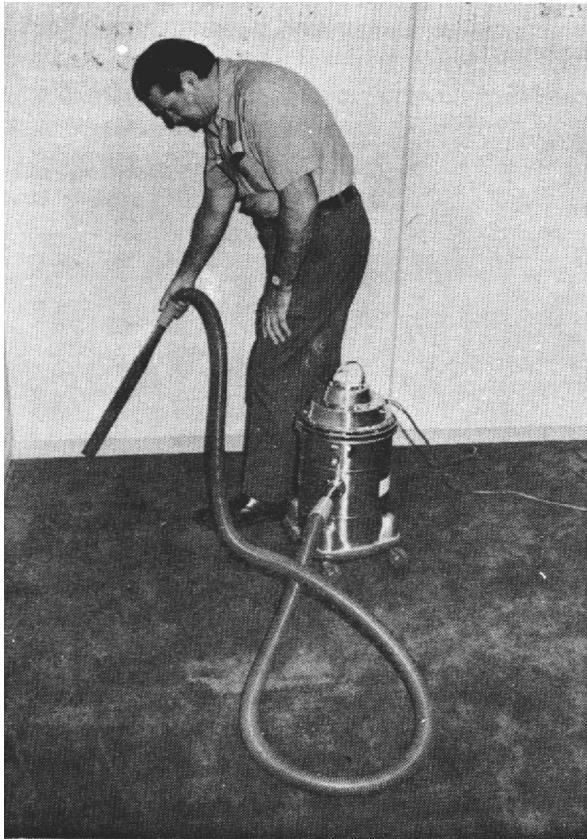
#### Section 4—CUSTODIAL MAINTENANCE EQUIPMENT, TOOLS, AND CHEMICALS

##### 7.4.1 Powered Equipment and Accessories

7.4.1.1 A 5- to 8-gallon capacity tank vacuum can be used for carpet policing, to vacuum the carpet in hard-to-reach areas, and to pick up the residue from the dry foam shampooing process. If the tank vacuum is equipped for wet, as well as dry pick-up, then it can be used to vacuum up spills and moisture

from carpet. The tank vacuum should be equipped with a flexible hose, wand, floor tool and crevice tool for carpet maintenance. When used with other attachments, the tank vacuum becomes a useful general purpose cleaning tool.

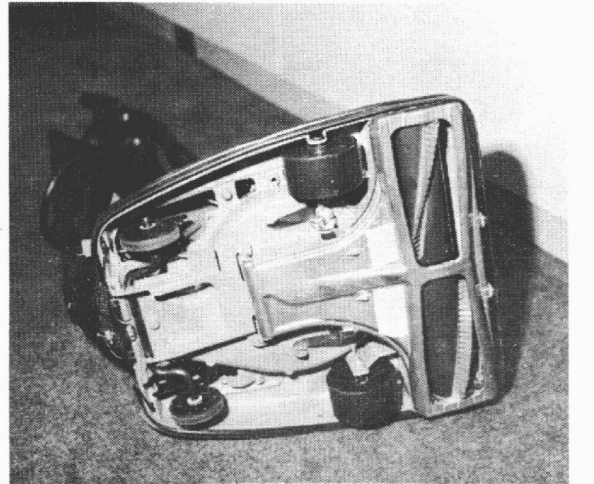
*CAUTION:* A tank vacuum cannot be used for routine vacuuming since it removes only a minimum amount of embedded grit.



**Figure 45. Wet/dry Tank Vacuum.**

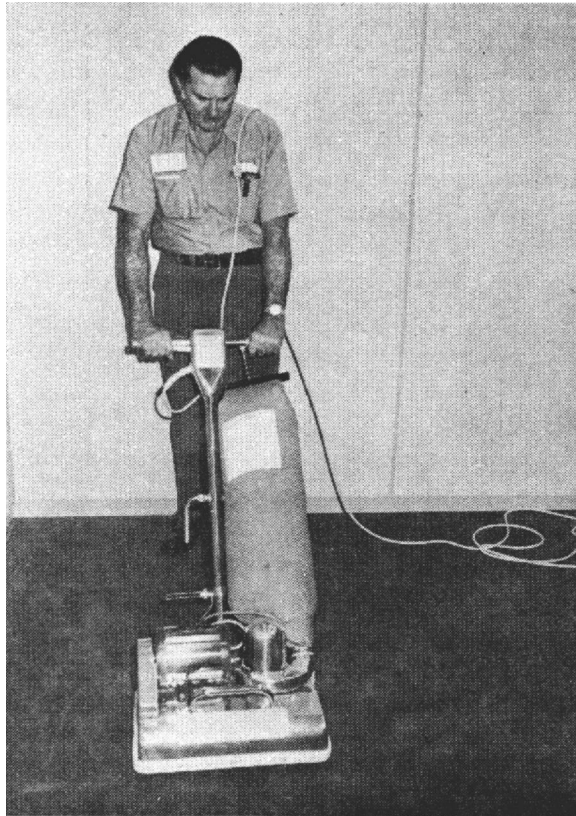
7.4.1.2 An upright carpet vacuum with a rotating agitator brush must be used for routine vacuuming. The agitator brush serves to agitate the carpet fibers and remove some of the embedded grit. The agitator brush should be ad-

justable for carpets with different pile heights, and the vacuum swath should be as wide as is practical to maximize the speed of vacuuming without impairing maneuverability.



**Figure 46. Upright Carpet Vacuum with Agitator Brush.**

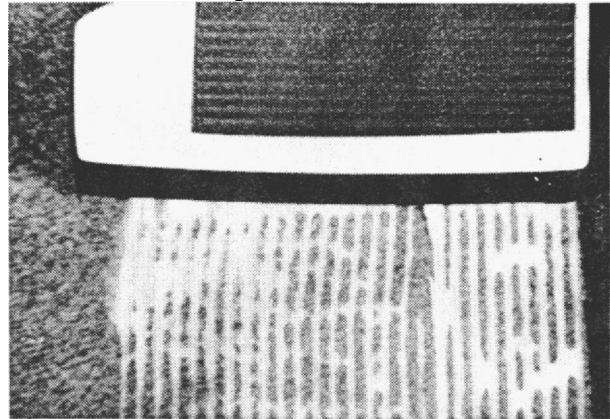
7.4.1.3 A heavy-duty pile lifter vacuum is used for removing embedded grit and for restoring the lost resiliency of the carpet pile caused by foot traffic. The pile lifter vacuum has a very aggressive vacuum and agitator brush which are normally powered by separate motors. The agitator brush should be adjustable for carpets with different pile heights.



**Figure 47. Heavy-Duty Pile Lifter Vacuum.**

7.4.1.4 A dry foam shampooer is used for the removal of large area stains and for complete surface shampooing. The dry foam process involves foam on the carpet, and the removal of the foam by a vacuum. The advantage of the foam system is that the small water content of the foam minimizes water damage to the carpet. The disadvantages of the system are that a residue of the foam is left embedded in the carpet, only surface soils and stains are removed, and heavier concentrations of soil may require several shampooings. The carpet should be vacuumed with a heavy-duty pile lifter vacuum prior to shampooing to remove as much soil as is practical, and also after shampooing to restore

the resiliency of the carpet pile and to remove much of the shampoo residue.



**Figure 48. Dry Foam Carpet Shampooer.**

7.4.1.5 A water extraction unit is used for the periodic removal of embedded grit, dry foam shampoo residue, and heavy soil and stains. The process involves the application of a highly-atomized water solution to the carpet through a "wand" followed by a continuous high vacuum. If the carpet has been cleaned previously by the dry foam process, there will be sufficient shampoo in the carpet for effective cleaning, otherwise a detergent must be added to the cleaning solution. The solution dissolves the dirt and dry foam residue, and the vacuum flushes or removes the dirt, residue, grit and moisture. The carpet is left in an almost dry condition. The advantages of the water extraction process are that it leaves almost no residue, it removes embedded grit, and is effective at removing heavier concentrations of soil and stains. The disadvantages of the system are that it is costly and the water may damage the carpet. As with the dry foam methods, the carpet should be vacuumed with a heavy-duty pile lifter vacuum before the water extraction process to remove as much soil as is practical and also after the process to restore the resiliency of the carpet pile.



**Figure 49. Water Extraction Unit.**

7.4.1.6 Some recently constructed buildings are equipped with central vacuum systems consisting of a powerful central vacuum and a distribution system with numerous vacuum inlets. A flexible hose and wand may be connected to any available outlet. Since a central vacuum system has no provision for agitating the carpet pile to remove embedded soil, this system should not be relied on for the routine vacuuming of carpet. It is, however, an effective system for policing and for the removal of surface soil from carpets, as well as other miscellaneous custodial vacuuming tasks.

#### 7.4.2 Manual Tools.

7.4.2.1 A synthetic bristle broom and dust pan can be used to police surface litter, such as bits of paper, rubber bands, and paper clips from carpet areas.

7.4.2.2 A small putty knife can be useful in removing chewing gum and other sticky substances from the surface of carpet.

7.4.2.3 A manual carpet sweeper can be used to police carpeted areas.



**Figure 50. Carpet Sweeper.**

#### 7.4.3 Chemicals.

7.4.3.1 An aerosol fluorocarbon can be used to "freeze" chewing gum, asphalt, wax, etc. so it becomes brittle and easily removed from carpet with a putty knife.

7.4.3.2 A foaming type shampoo concentrate is required for the dry foam shampoo method. The dry foam shampooer will generate a low moisture content foam and then apply the foam to the carpet. Only a low foam shampoo concentrate should be used with the water extraction unit if a detergent is required at all. If the extraction unit has a recovery tank, then an anti-foam emulsion must be added to the recovery tank to prevent the tank from becoming filled with foam. Most manufacturers of carpet shampoo claim their product has retarding properties; however, many conflicts of opinion presently exist about their effectiveness. Their success would largely depend upon such factors as the type and concentrations of soil, the type of carpet, the type maintenance the carpet receives, the age of the carpet, etc.

7.4.3.3 Removal of most stains can be accomplished with a commercial stain removal kit which contains the following groups of stain removers as a minimum:

(1) Mild alkaline spotters containing enzymes for the break-up of protein based substances, such as blood, food, vomit.

(2) Dry solvent base spotters for use on grease, tar, gum and paint.

(3) Mild acid reducing solutions for removing caustic or alkaline substances, animal feces, and urine.

(4) Dry, inert, absorbent powder to be used with the above.

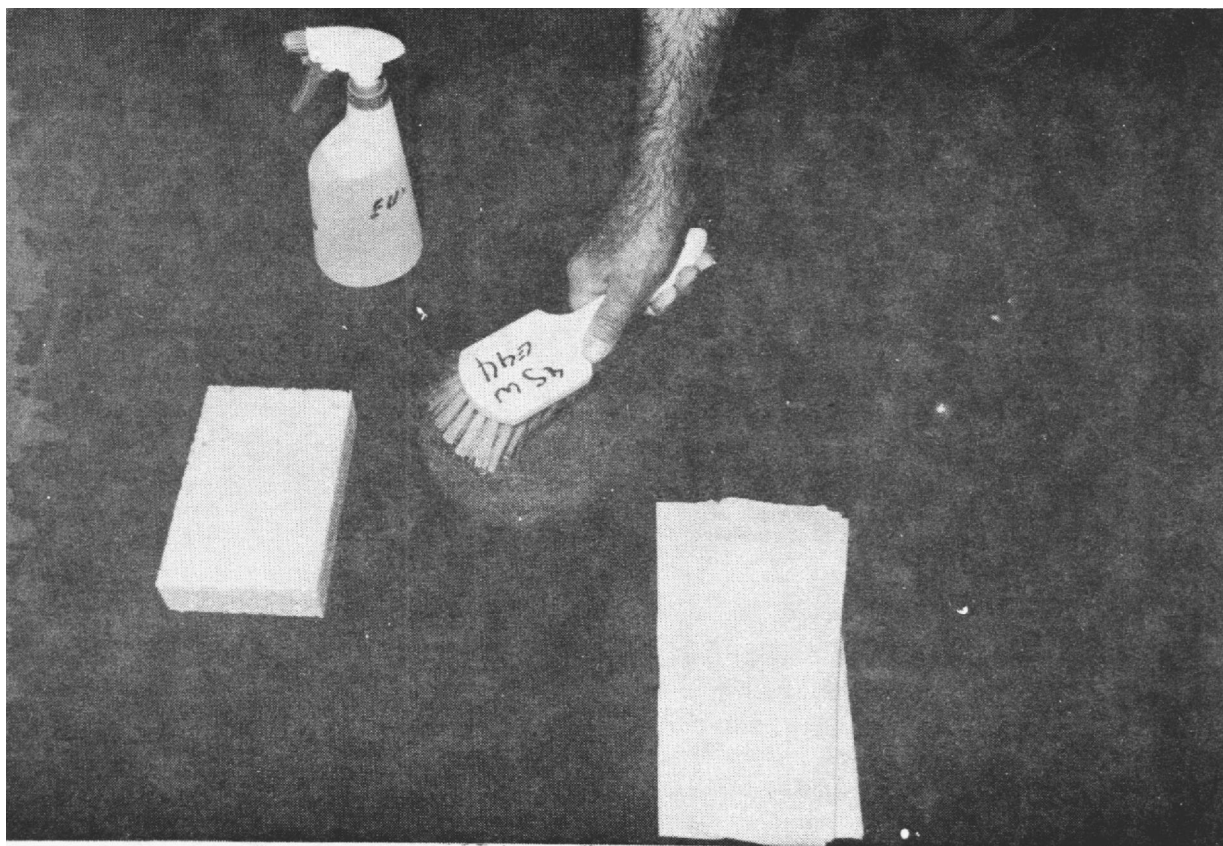
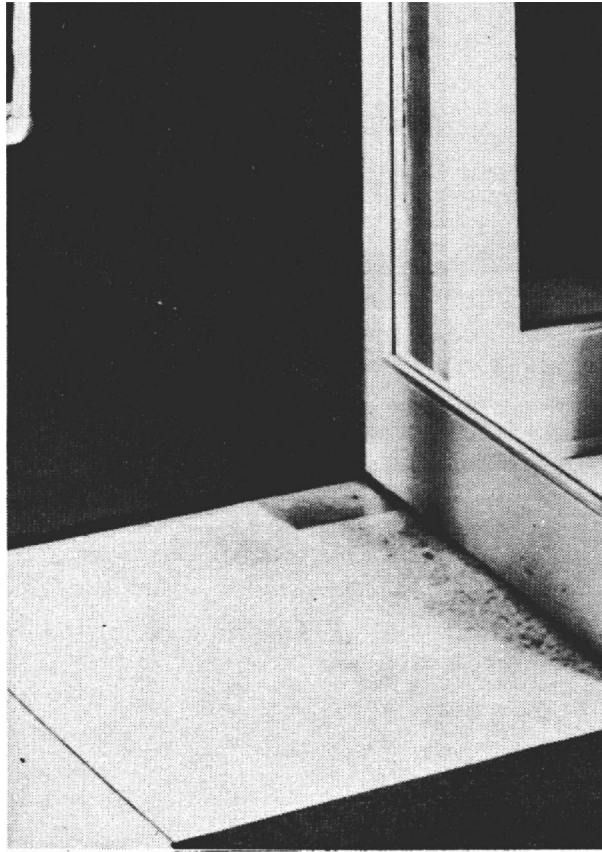


Figure 51. Stain Removal.

## Section 5 — SOIL PREVENTION

7.5.1 Obviously the cost of carpet maintenance can be significantly reduced, and the appearance and life of carpet can be improved and extended if the amount of soil deposited on a carpeted area is reduced. Just as there are many different sources and types of soil to which carpet becomes exposed, there are also many actions which can be taken to reduce the amount

of soil. However, the most effective means of soil prevention or reduction are entrance mats and adequate waste and ash receptacles. Part of an effective carpet maintenance program involves the continued surveying of an area to determine whether there are actions which can reduce the soiling rate and whether they are economically justifiable.



**Figure 52. Entrance Mats.**

## Section 6 — STATIC CHARGE

**7.6.1 Source.** Carpet which has not been manufactured with special conductive materials to allow the dissipation of accumulated electrostatic charges may develop such charges in excess of 10,000 volts. The accumulation of static electricity in carpet is not only annoying but may also cause carpet to attract a larger amount of soil. Additionally, the attraction between particles of soil and the carpet make vacuuming and shampooing less effective.

**7.6.2 Prevention.** The simplest means of reducing static electricity is to increase the moisture content (humidity) of the surrounding area allowing the accumulated static electricity to discharge into the air. Humidifying units are available that can be added to air conditioning units. A second method of reducing static charge is through application of an antistatic treatment. However, such treatment is costly and its effects may last as little as thirty days.

## Section 7 — CARPET CARE PROCEDURES — TRAINING GUIDE

### 7.7.1 Policing.

#### 7.7.1.1 *Equipment Needed:*

- (1) Small broom
- (2) Dust pan
- (3) or a manual carpet sweeper.

#### 7.7.1.2 *Doing the Job:*

- (1) Observe the area for surface litter or soil.

- (2) Pick-up litter either by hand or by sweeping the litter into the dust pan or use the carpet sweeper.

- (3) Dispose of collected litter into custodial cart or adjacent waste container.

#### 7.7.1.3 *Care of Equipment:*

- (1) Keep broom free of loose straws and lint.



(2) Damp wipe dust pan and carpet sweeper with neutral detergent as required to remove evident soil.

#### **7.7.2 Routine vacuuming.**

##### *7.7.2.1 Equipment Needed:*

(1) Upright carpet vacuum with adjustable agitator brush.

##### *7.7.2.2 Before Vacuuming:*

(1) Inspect the vacuum cleaner dirt bag to determine the level of soil. The bag should not be allowed to become over half filled. Take special care when emptying the bag to avoid spreading dirt.

(2) Police the immediate area to remove items which should not be ingested into the vacuum cleaner.

(3) Unless only traffic patterns are being vacuumed, create as much open area as practical by moving items such as trash cans, chairs, and portable furniture.

(4) Adjust the agitating brush in accordance with the carpet pile height.

##### *7.7.2.3 Doing the Job.*

(1) When vacuuming traffic patterns in a large open area, begin at one end of the pattern and proceed to the other end or as far as the electrical cord permits. Then, return alongside and slightly overlap the edge of each previous pass. This pattern may have to be repeated for heavily soiled areas.

(2) When vacuuming obstructed areas, use a few back-and-forth strokes as required.

(3) Return any items moved to their proper locations.

##### *7.7.2.4 Care of Equipment:*

(1) Check dirt bag and empty as required.

(2) Prior to returning the equipment to storage, wipe dust from the machine and the cord, spot clean smudges and marks with neutral detergent and sponge.

#### **7.7.3 Stain Removal.**

##### *7.7.3.1 Equipment Needed:*

(1) A commercial stain removal kit.

(2) Wet pickup vacuum (for larger spills).

(3) Paper towels or blotters.

##### *7.7.3.2 Doing the Job:*

(1) Treat the stain as quickly as possible after it is discovered.

(2) Scrape and blot up as much of the loose matter as possible.

(3) Pre-test any questionable fibers with the spotter to be used.

(4) When removing stains, work from the outside edges of the soiled area inward to the center of the spot to minimize spreading the spot.

(5) Follow the instructions contained in the commercial spot removal kit.

#### **7.7.4 Heavy-duty Vacuuming and Pile Lifting.**

##### *7.7.4.1 Equipment Needed:*

(1) Heavy-duty pile lifter with adjustable agitator brush.

##### *7.7.4.2 Before Vacuuming:*

(1) Follow steps (1) to (4) of "Before vacuuming," paragraph 7.7.2.2.

##### *7.7.4.3 Doing the Job:*

(1) Follow steps (1) to (3) of "Doing the Job," paragraph 7.7.2.3.

##### *7.7.4.4 Care of Equipment:*

(1) Follow steps (1) to (3) of "Care of equipment," paragraph 7.7.2.4.

#### **7.7.5 Surface Shampooing.**

##### *7.7.5.1 Equipment Needed.*

(1) One heavy-duty pile lifter vacuum

(2) One dry foam carpet shampoo machine

(3) One plastic pail

(4) One plastic funnel

(5) One measuring cup

(6) One scrub brush

(7) One sponge

*Note:* When shampooing carpets, it is a good idea to have a wet vacuum available in case of spills or malfunctions of the shampoo machine which put excessive amounts of solution on the carpet.

##### *7.7.5.2 Chemicals Needed:*

(1) Dry foam carpet shampoo

(2) Stain removal kit

##### *7.7.5.3 Before Vacuuming:*

(1) Remove as much furniture from the area as is practical.

(2) Vacuum the area with a heavy-duty pile lifter in accordance with paragraph 7.7.5, "Heavy-duty vacuuming and pile lifting".

(3) Treat stains in accordance with paragraph 7.7.3, "Stain removal".

(4) Be sure that custodial worker's shoes are clean or, preferably, wear clean, rubber, overshoes when shampooing carpet.

(5) Restrict traffic into the area.

(6) Using the plastic pail and the measuring cup, prepare the shampoo solution in accordance with the manufacturer's directions. Using the funnel, carefully pour the solution into the tank of the carpet shampoo machine.

(7) Before turning on the machine, follow the manufacturer's directions for adjusting the height of the agitator brush to be compatible with the pile of the carpet. Remember, if the brush is adjusted too high, it will not produce effective results; if the brush is too low, there will be excessive wear on the carpet and unnecessary strain on the machine.

#### 7.7.5.4 *Doing the Job:*

(1) Begin scrubbing next to the wall or an edge of the carpeted area. Adjust the foam control and pace the motion of the machine so that sufficient, but not excessive, foam is applied to the carpet.

(2) Move the machine forward as far as possible in a straight line. Then, move the machine backwards over the same area.

(3) At the end of each forward and backward pass, move the machine to one side and repeat this pattern on an adjacent area. The degree of overlap should be determined by the level of soil in the carpet. For instance, if the carpet is heavily soiled, it may be necessary to overlap more than half of each previous pass for effective cleaning. In areas where soil is light, an overlap of one to two inches may be sufficient. In cases of extreme soiling it may be necessary to shampoo twice. Any second shampooing should follow a pattern which is generally at right angles to that of the first shampooing.

(4) Corners and other areas which are not accessible to the machine may be shampooed by taking some of the foam generated by the machine and applying it manually with the scrub brush.

(5) After allowing about one hour drying time, vacuum the entire area with the heavy-duty pile lifter vacuum in accordance with paragraph 7.7.5. "Heavy-duty vacuuming and pile lifting". However, after each forward pass, pull the pile lifter vacuum backwards over the same area to lift out any footprints or wheel tracks.

(6) Allow sufficient time for the carpet to dry before it is subjected to heavy foot traffic. Drying time will vary considerably due to changes in temperature and humidity.

(7) When replacing the furniture in the area, place small pieces of plastic underneath legs or other parts which come in contact with the carpet. This will prevent stains from rust and dyes which could occur if the carpet is still damp. Remove the plastic after the carpet has thoroughly dried.

#### 7.7.5.5 *Care of Equipment*

(1) Follow the manufacturer's directions for draining any excess solution from the shampoo machine. This should be done in a non-carpeted area in case of spills.

(2) Damp wipe the machine and cord with a sponge.

(3) Wind the electrical cord properly around the hooks provided on the machine.

(4) Rinse the bucket, funnel, and measuring cup clean and wash the scrub brush and sponge in clean water.

#### 7.7.6 **Extraction Cleaning.**

##### 7.7.6.1 *Equipment Needed:*

(1) One water-extraction carpet cleaning outfit

(2) One heavy-duty pile lifter vacuum

(3) One plastic pail

(4) One plastic funnel

(5) One measuring cup

(6) One wet/dry tank vacuum

(7) Scrub brush

(8) Sponge

##### 7.7.6.2 *Chemicals Needed:*

(1) Antifoam emulsion and carpet shampoo specifically designed to be used with water extraction system (carpet shampoo to be used only on carpet which has never or seldom been shampooed before).

##### 7.7.6.3 *Before Cleaning:*

(1) Follow steps (1) to (5) in "Before shampooing," paragraph 7.7.5.3.

(2) The water extraction unit should be assembled in accordance with the instructions of the manufacturer of the machine. Some models may be attached directly to a water source while others have a tank as a part of the machine. Some manufacturers recommend the use of hot water with their equipment, others provide a heating element in the solution tank, and others recommend the use of cold water. Although hot water may react more quickly with shampoo residue in the carpet, in general, cold water will provide adequate cleaning without the risk of shrinkage, color bleeding, or damage to the carpet backing which may result from excessive use of hot water.

(3) If the carpet has never or seldom been shampooed, add the proper amount of carpet shampoo solution to the solution tank using the measuring cup and funnel (if the carpet has been previously shampooed three or four times, there

will be sufficient residue in the carpet for effective cleaning).

(4) Add the proper amount of antifoam emulsion to the recovery tank, following any specific directions given by the manufacturer.

*7.7.6.4 Doing the Job:*

(1) Begin in a corner of the area. Stand next to one wall while facing another wall. Stand far enough back so that a comfortable reach will place the spray-vacuum head against the baseboard (usually about 3 feet away).

(2) Activate the spray system while pulling the spray-vacuum head away from the wall in a straight line.

(3) Shut off the spray about 6 inches before the end of the stroke. If the spray-vacuum head can be easily pushed on the carpet, it should be pushed back to the wall, over the same path, with the spray shut off. If the spray-vacuum head cannot be easily pushed, but can only be pulled, it should be lifted at the end of the stroke, returned to the original spot where the pass began, and pulled over the same area with the spray shut off. This technique gives each area a minimum of two passes, one with the spray and the vacuum, and one with the vacuum only.

(4) After making the two passes described above, move the spray-vacuum head and repeat the process.

(5) The degree of overlap and the speed with which the spray-vacuum head is moved on the carpet depends on the level of soil. Along walls, baseboards, and other areas receiving little or no traffic, the machine can be moved quickly and with as little overlap as possible without

leaving streaks. In heavily soiled areas or high traffic areas, the spray-vacuum head should be moved more slowly and each pass should overlap the previous pass by about fifty percent.

(6) The recovery tank should be watched and emptied whenever the foam rises within two or three inches of the top. If foam or water is allowed to enter the vacuum motor system, serious damage or injury may result.

(7) After the entire carpet has been cleaned, it should be allowed to dry approximately one-half hour and vacuumed with the pile lifter type vacuum. When vacuuming a carpet after it has been wet-cleaned, the final passes with the vacuum over each area should always be in the same direction.

(8) When returning furniture and accessories to a carpeted area which has just been cleaned, pieces of plastic should be placed under the legs or any part which touches the carpet. The carpet may still be slightly damp, and subject to stains from rust and dyes.

*7.7.6.5 Care of Equipment:*

(1) Follow the manufacturer's directions for draining the recovery tank. Both the solution and recovery tanks should be rinsed and wiped dry.

(2) The vacuum hose, wand and spray-vacuum head should be rinsed out by flushing clean water through them.

(3) All exterior surfaces of the machine including the electrical cord should be damp cleaned and then wiped dry.

(4) Wind the electrical cord properly around the hooks provided on the machine.

***Summary of Revised, Deleted, or Added Material***

This revision is a complete rewrite and update of existing Army, Navy, and Air Force manuals into a three-department manual.

## GLOSSARY

*Antiseptic.* A product that will destroy or curb germs, particularly on living tissue. Also applied to products with low phenol coefficients.

*Acid.* Sour or sharp to the taste. Chemistry: below 7.0 on the PH scale.

*Alkali.* Any base or hydroxide, as soda or potash, etc., that is soluble in water and can neutralize acids. Chemistry: above 7.0 on the PH scale.

*Abrasive.* A substance used for grinding, polishing, etc.

*Bactericide.* A product that will destroy that certain class of germs known as bacteria.

*Cellulose.* The chief substance composing the cell walls or woody part of plants.

*Conductive Floor.* A floor that will conduct electricity and thereby equalize the electric potential within an area to prevent an explosion.

*Deodorant.* A product that destroys or covers up an odor or the source of an odor. A germicide performs a deodorizing function when it kills germs that cause odors.

*Detergent.* Anything that will clean. Usually referring to a synthetic or soapless detergent.

*Disinfectant.* A product that will destroy germs, particularly for use on inanimate objects.

*Fogging.* Dispersing colloidal particles of a germicidal liquid into the air of a room by means of a special machine for the purpose of reducing the bacterial flora.

*Germ.* A microorganism capable of producing a disease.

*Germicidal Detergent.* A detergent using a germicide in its composition. Economies can be gained by one-step cleaning and disinfecting.

*Moveable Furniture.* Any furniture that is readily moveable by one person, and is intended to be moved frequently.

*PH Factor:* the degree of acidity and alkalinity expressed in numerical value. The value PH 7.0 is the neutral point; that is a solution having a PH of 7.0 is neither acid or alkaline. The numbers below 7.0 denote the degree of acidity, and the numbers above 7.0 denote the degree of alkalinity.

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|                                   |                  | Work Load                | 2.1             |

| ANALYSIS OF CUSTODIAL PERSONNEL REQUIREMENTS |                      |                |                       |              | <input checked="checked" type="checkbox"/> MONTHLY<br><input type="checkbox"/> ANNUALLY |   | FREQUENCY CODE<br>D DAILY<br>W WEEKLY<br>2W TWICE WEEKLY<br>M MONTHLY | DAILY TWICE WEEKLY MONTHLY |          | 2M TWICE MONTHLY<br>M2 EVERY 2 MOS<br>M3 EVERY 3 MOS<br>M4 EVERY 4 MOS |           | M6 EVERY 6 MOS<br>Y YEARLY<br>O OTHER |                             | PRODUCTIVE MAN-HOURS<br>229 | MAX HOUR AND PERSONNEL REQUIREMENTS |       | PERSONNEL REQUIRED (BY 1000 SQ FT)<br>296 | PERSONNEL REQUIRED (BY 1000 SQ FT)<br>1.7 |               | AS OF DATE<br>1 JUN 82 | INSTALLATION<br>FT Station |                |                  |         |                    |                        |        |                      |         |                 |         |           |                 |            |              |          |       |               |            |                            |            |          |               |       |      |       |      |   |   |      |      |       |   |       |   |      |    |      |    |    |       |
|--|----------------------|----------------|-----------------------|--------------|---|---|---|----------------------------|----------|--|-----------|---------------------------------------|-----------------------------|-----------------------------|-------------------------------------|-------|---|---|---------------|------------------------|----------------------------|----------------|------------------|---------|--------------------|------------------------|--------|----------------------|---------|-----------------|---------|-----------|-----------------|------------|--------------|----------|-------|---------------|------------|----------------------------|------------|----------|---------------|-------|------|-------|------|---|---|------|------|-------|---|-------|---|------|----|------|----|----|-------|
| LINE NO.                                     | BUILDING NO. AND USE | SPACE SERVICED | TYPE OF FLOOR SURFACE | AREA (SQ FT) | FLOOR CLEANING  |   |   |                            |          |  |           |                                       | TOILET AND FIXTURE CLEANING |                             |                                     |       |   | WALLS PART ONE WOOD WORK                  |               | SPENDER                |                            | GLASS CLEANING |                  | DUSTING |                    | MISCELLANEOUS CLEANING |        | WALLS PART TWO METAL |         | SPRINKLER CLEAN |         | FURNITURE |                 | STAR WALKS |              | EXHAUSTS |       | WASTE BASKETS |            | TOTAL PRODUCTIVE MAN-HOURS |            |          |               |       |      |       |      |   |   |      |      |       |   |       |   |      |    |      |    |    |       |
|  |                      |                |                       |              | SWEEP   |   | DUST MOP  |                            | DAMP MOP |  | VACUUMING |                                       | BUFFING                     |                             | STRIP/REWAX                         |       | CYLINDRICAL MACHINE                       |   | WATER CLOSETS |                        | URINALS                    |                | SINKS WASH BOWLS |         | DRINKING FOUNTAINS |                        | FLOORS |                      | WINDOWS | FURNITURE       | SCREENS | SHADES    | VENETIAN BLINDS | EXHAUSTS   | AIR CONTROLS | AIR CON. | ROOFS | WALLS         | SPRINKLERS | FURNITURE                  | STAR WALKS | EXHAUSTS | WASTE BASKETS | TOTAL |      |       |      |   |   |      |      |       |   |       |   |      |    |      |    |    |       |
|  |                      |                |                       |              | F   | M | F   | M                          | F        | M  | F         | M                                     | F                           | M                           | F                                   | M     | F   | M   | F             | M                      | F                          | M              | F                | M       | F                  | M                      | F      | M                    | F       | M               | F       | M         | F               | M          | F            | M        | F     | M             | F          | M                          | F          | M        | F             | M     | F    | M     | F    | M | F | M    | F    | M     | F | M     | F | M    | F  | M    | F  | M  |       |
| 1  | BLDG 40              | EAST           | ASPH T                | 5,000        | D   | 2 |   | W                          | 7        |  | M         | 2                                     | M                           | 6                           | 1                                   |       |   |   | 3/D           | 2                      | 1/D                        | 1              | 2/D              | 1 1/2   | 1/D                | 1                      | 100%   | 2 1/2                | 7/D     | 2               | 100%    | 1/2       | 2/W             | 1          | 75/D         | 11       | M     | 6             | 1/2        | 100%                       | 1/2        | 18/Y     | 3             | 52/Y  | 1/2  | 100%  | 3    | Y | 2 | 30/M | 2    | 2/3W  | 1 | 2/3W  | 1 | 13/D | 7  | 77.5 |    |    |       |
| 2  | (ADMIN BLDG)         | 1ST FL         | VINYLT                | 10,000       | D   | 3 |   | W                          | 12       |  | M         | 3                                     | M                           | 6                           | 2                                   |       |   |   | 5/D           | 3 1/2                  | 2/D                        | 1 1/2          | 3/D              | 2       | 1/D                | 1                      | 20%    | 4                    | 2 1/2   | 7/D             | 2 1/2   | 100%      | 1/2             | 3/W        | 2            | 159/D    | 42    | M             | 6          | 1                          | 100%       | 1        | 79/Y          | 6     | 100% | 1 1/2 | 27/M | 5 | Y | 3    | 71/M | 3 1/2 |   |       |   |      |    |      | 46 | 14 | 151.5 |
| TOTALS                                       |                      |                |                       |              |   | 5 |   | 19                         |          | 5  | 3         |                                       |                             |                             | 5 1/2                               | 2 1/2 | 3 1/2                                     | 2   | 6 1/2         | 6                      | 4 1/2                      | 2              | 3                | 53      | 1 1/2              | 1 1/2                  | 9      | 2                    | 8       |                 |         |           |                 |            |              |          |       |               |            |                            |            |          |               |       |      |       |      |   |   |      |      |       |   | 5 1/2 | 1 | 1    | 21 | 229  |    |    |       |

