

**Maintenance Manual and Service Contracts  
for  
Housing Managers**

**Instructors Guide**

**HUD-0050653**

U.S. Department of Housing and Urban Development  
Office of Policy Development and Research



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# Maintenance Management and Service Contracts for Housing Managers

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Instructor's Guide



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Instructor's Guide |

February, 1979 |

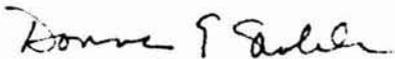
The research forming the basis for this workshop was conducted pursuant to grants between the U.S. Department of Housing and Urban Development and the five universities listed on the page of acknowledgements. Statements and information contained in this workshop are those of the grantees who assume sole responsibility for their accuracy and completeness.

## FOREWORD

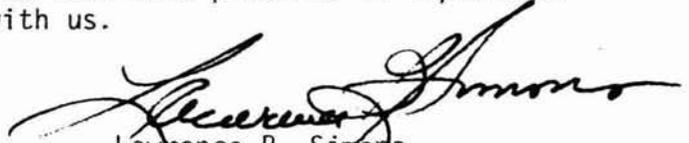
This instructor's guide is one of eighteen in a housing-management curriculum developed by HUD in conjunction with Temple University.

The guide reprints all the material in the participant's workbook, but gives more detailed information where necessary and answers the test questions.

Our hope is that with your help, the workshops using this curriculum will advance professionalism in the field of housing management. The lack of professionalism -- that is, the lack of uniform standards which allows people of varying knowledge and abilities to manage HUD-assisted and privately financed housing -- has contributed to some serious problems: high default rates, abandonments, and vandalism. To correct such problems is important. We are glad to have you working with us.



Donna E. Shalala  
Assistant Secretary for  
Policy Development and Research



Lawrence B. Simons  
Assistant Secretary for  
Housing -- Federal Housing  
Commissioner

## PREFACE

Each workbook in this series presents a number of learning objectives targetted to a selected area of management. Successful completion of the learning objectives presented in each workbook provides a series of building blocks to buttress the spectrum of skills required of a housing manager.

In preparing these workbooks, an attempt has been made to incorporate the range of knowledge that housing managers might be required to draw upon. Likewise, an attempt has been made to reflect the present state-of-the-art of housing management. Inevitably, whatever is captured in print reflects a body of knowledge and practice up to the point of publication. Therefore, the students and instructors making use of these workbooks will want to keep alert to new developments that should be integrated into the workbook material. Furthermore, like any attempt to codify knowledge in a particular field, the material presented in these workbooks is open to differences of interpretation and emphasis. We are aware that there may be some techniques and procedures described in these workbooks with which some experts in the field might disagree. The best test of such procedures and techniques will come when they are applied in the field by housing management practitioners. Through this process, the state-of-the-art will continue to be improved. Instructors in the future will undoubtedly want to incorporate such acknowledged improvements into their delivery of the workbook material.

One final point is worth mentioning. An initial impetus for these workbooks was the need to upgrade management skills in HUD-related housing. However, many of the principles presented should be viewed by students and instructors as applicable to multifamily housing management practices in the private sector.

## ACKNOWLEDGEMENTS

The five universities listed below worked together to develop a college-level curriculum for housing management. The fifteen modularized workshops were developed and compiled by the Center for Social Policy and Community Development at Temple University using specific elements of the college curriculum.

Center for Housing and Real Estate  
School of Business and Public Administration  
Howard University  
Washington, D. C. 20059

Housing Management Program  
College of Business  
Southern University and A & M College  
Baton Rouge, Louisiana 70813

Center for Social Policy and Community Development  
Housing Management Institute  
Temple University  
Philadelphia, Pennsylvania 19122

School of Public Affairs  
Texas Southern University  
Houston, Texas 77004

Housing Management Division  
Business Department  
Winston Salem State University  
Winston Salem, North Carolina 27102

TABLE OF CONTENTS

	<u>PAGE</u>
A. INTRODUCTION	ii
B. PART I	
Maintenance Management for Housing Managers	iii
C. PART II	
Service Contracts for Housing Managers	40

INTRODUCTION

This workshop, Maintenance Management and Service Contracts for Housing Managers, consists of two parts.

Part I, Maintenance Management for Housing Managers, requires two half-day sessions.

Part II, Service Contracts for Housing Managers, requires one half-day session.

PART I  
MAINTENANCE MANAGEMENT FOR HOUSING MANAGERS

TABLE OF CONTENTS

	<u>PAGE</u>
PART I	
MAINTENANCE MANAGEMENT FOR HOUSING MANAGERS	
I. INTRODUCTION	v
II. HOW TO USE THE INSTRUCTOR'S GUIDE	vii
III. WORKSHOP MATPIX	ix
IV. CONTENT	1
GOAL AREA 1	2
Scheduling, Planning and Estimating Work	2
Coordinating and Estimating	3
Scheduling	4
GOAL AREA 2	7
Maintenance Work Order Format	8
Coding of Maintenance Work Orders	9
Using Maintenance Work Orders	10
GOAL AREA 3	12
Setting Maintenance Goals	13
Work Sampling Technique	14
Job Slotting Technique	14
Standard Data Technique	15
Budget Requirements for Maintenance	17
Annualizing and Calculating Costs	18
GOAL AREA 4	20
Education and Training	21
V. POST-TEST	24
Answers to Post-Test	29
VI. SKILL-TEST	32
Answers to Skill-Test	37

INTRODUCTION

TO PART I

MAINTENANCE MANAGEMENT FOR HOUSING MANAGERS

Maintenance management involves the proper scheduling, staffing, and budgeting of maintenance functions. Part I of the workshop strives to prepare managers to be better able to perform such tasks by familiarizing them with methods for establishing specific time guidelines for doing routine and preventive maintenance, with strategies for insuring the proper staffing of qualified personnel to perform needed tasks, and with techniques for determining cost factors and differentials necessary to accomplish various maintenance tasks. Accordingly, it has four overall goals:

- (1) To enable managers to accurately estimate and appropriately schedule maintenance work,
- (2) To enable managers to design a functional maintenance management system,
- (3) To enable managers to functionally control a maintenance department and budget maintenance expenditures, and
- (4) To enable managers to establish maintenance staffing, personnel, and training guidelines.

Each goal has several learning objectives. These learning objectives are, simply, measurable statements about the specific knowledge participants are expected to acquire in the workshop.

Each learning objective, in turn, has what is called an anticipated practice outcome. Anticipated practice outcomes are those practical skills a participant can be expected to implement on the job using the information acquired in the workshop.

In other words, anticipated practice outcomes refer to the ways knowledge acquired in the workshop can be applied to real problems and situations.

Part I of this workshop, organized around the learning objectives and anticipated practice outcomes, requires two half-day sessions.

HOW TO USE THE INSTRUCTOR'S GUIDE

This is the Instructor's Guide to Part I of the workshop: Maintenance Management for Housing Managers. In addition to listing goals, learning objectives, and anticipated practice outcomes, it contains a detailed content section, and discusses appropriate methodology and resources. It also provides answers to the post-test evaluations and suggests criteria for evaluating results of the skill-test items.

The Participant's Workbook for the workshop contains the same introduction and description of goals, learning objectives and anticipated practice outcomes. However, the content and methodology are less detailed and only those materials required for participants in the post-test and skill-test are included.

The workshop is organized around learning objectives and anticipated practice outcomes. The overall workshop plan is presented in the matrix on pages ix through xiv.

At the top of each page is a box containing the overall problem. At the far left of each page is one of the overall goals of the workshop. The goals state in broad terms how the workshop will address the problem.

To the right of each goal statement are its learning objectives. These objectives represent specific knowledge a participant is expected to acquire during the workshop.

In the next column to the right, under "Content," is a list of the material to be covered for each goal.

Moving farther right, the next column contains methodology. Outlined in this column are the teaching methods suggested for the workshop. In this workshop a series of informal lectures will be used.

The next column, labeled "Resource," contains a description of who will conduct the course. For this workshop, program staff can be used.

The next column to the right lists those corresponding post-test items which will measure how well participants met the learning objectives.

This column is followed by the anticipated practice outcomes, which are more practical, job-related skills or attitudes the participant is expected to acquire.

Finally, the last column on each page lists corresponding skill-test items which will measure how well participants met the anticipated practice outcomes.

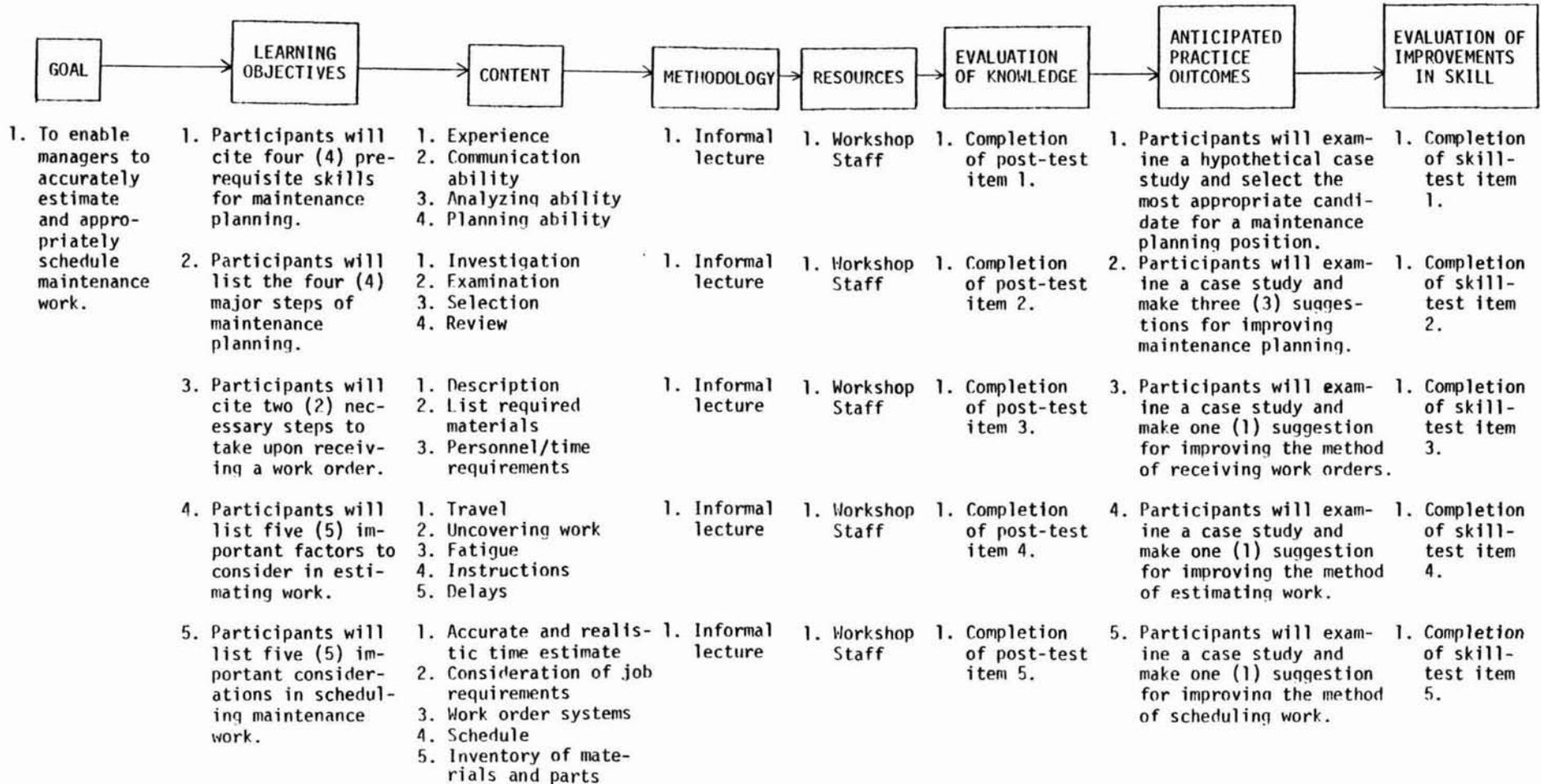
WORKSHOP MATRIX

PART I

WORKSHOP MATRIX

PROBLEM

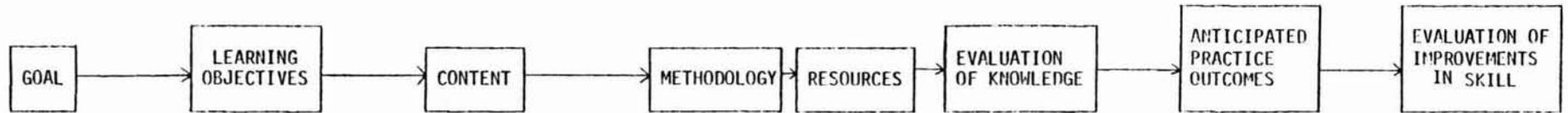
Managers need to familiarize themselves with the proper scheduling, staffing, and budgeting of maintenance functions.



WORKSHOP MATRIX

PROBLEM

Managers need to familiarize themselves with the proper scheduling, staffing, and budgeting of maintenance functions.



2. To enable managers to design a functional maintenance management system.

1. Participants will list six (6) important elements of a work order system

1. Instructions
2. Cost control
3. Record-keeping
4. Control
5. Standardization
6. Clearinghouse

1. Informal Lecture

1. Workshop Staff

1. Completion of post-test item 6.

1. Participants will examine a case study and establish a working system for work orders.

1. Completion of skill-test item 6.

2. Participants will list four (4) practical considerations for using maintenance work orders.

1. Received by maintenance department
2. Cleared by foreman
3. Passed to assignee
4. Returned when work is completed

1. Informal lecture

1. Workshop Staff

1. Completion of post-test item 7.

2. Participants will examine a case study and make one (1) suggestion for improving the method of using maintenance work orders.

1. Completion of skill-test item 7.

3. Participants will list two (2) options for accurately reporting work time expended in completing work orders.

1. Job ticket with time clocks
2. Time cards

1. Informal lecture

1. Workshop Staff

1. Completion of post-test item 8.

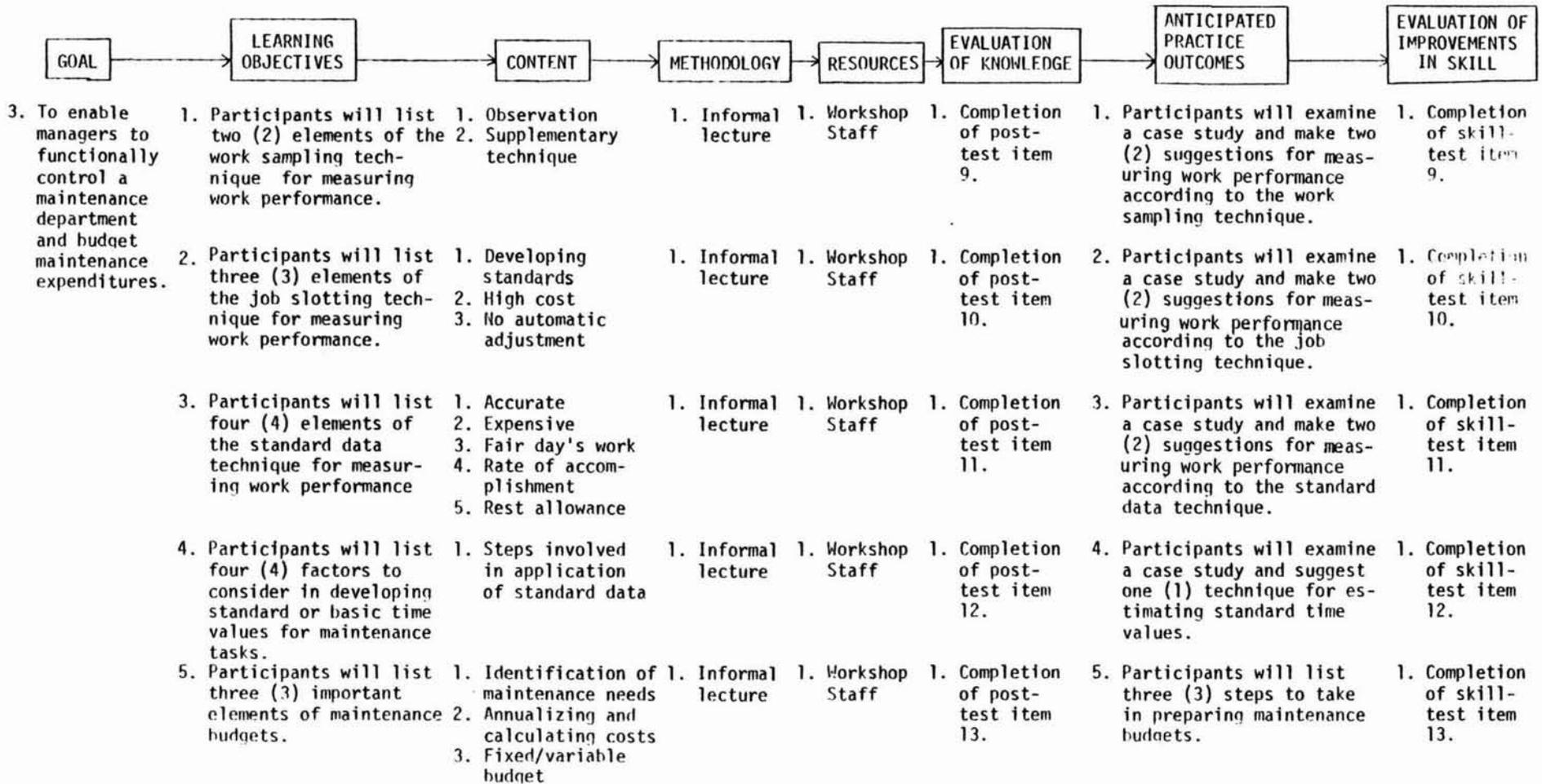
3. Participants will examine a case study and make one (1) suggestion for improving the way maintenance workers report time expended in completing work orders.

1. Completion of skill-test item 8.

WORKSHOP MATRIX

PROBLEM

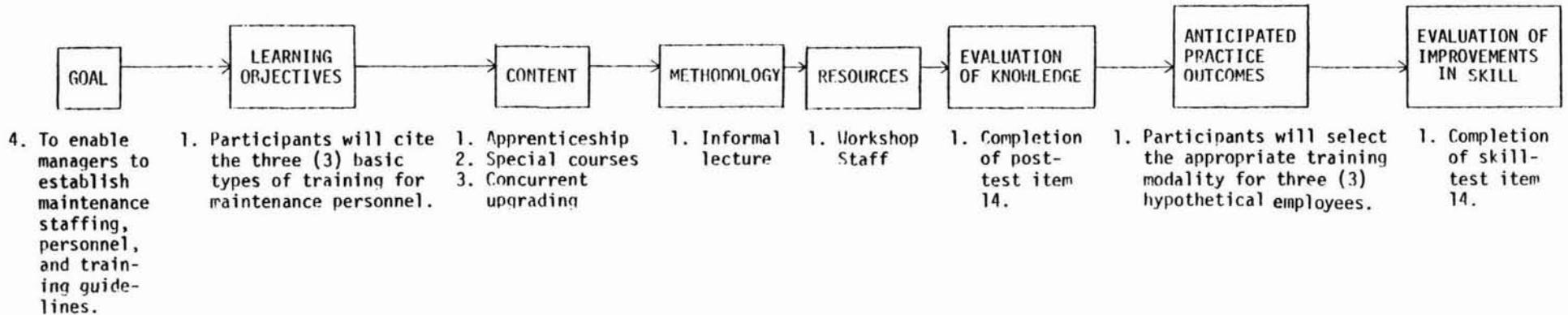
Managers need to familiarize themselves with the proper scheduling, staffing, and budgeting of maintenance functions.



WORKSHOP MATRIX

PROBLEM

Managers need to familiarize themselves with the proper scheduling, staffing, and budgeting of maintenance functions.



GOAL AREA 1

TO ENABLE MANAGERS TO ACCURATELY ESTIMATE  
AND APPROPRIATELY SCHEDULE MAINTENANCE WORK

GOAL AREA 1: TO ENABLE MANAGERS TO ACCURATELY ESTIMATE AND APPROPRIATELY SCHEDULE MAINTENANCE WORK

LEARNING OBJECTIVES

ANTICIPATED PRACTICE OUTCOMES

- |   |   |
|---|---|
| 1. Participants will cite four (4) prerequisite skills for maintenance planning.            | 1. Participants will examine a hypothetical case study and select the most appropriate candidate for a maintenance planning position. |
| 2. Participants will list the four (4) major steps of maintenance planning.                 | 2. Participants will examine a case study and make three (3) suggestions for improving maintenance planning.                          |
| 3. Participants will cite two (2) necessary steps to take upon receiving a work order.      | 3. Participants will examine a case study and make one (1) suggestion for improving the method of receiving work orders.              |
| 4. Participants will list five (5) important factors to consider in estimating work.        | 4. Participants will examine a case study and make one (1) suggestion for improving the method of estimating work.                    |
| 5. Participants will list five (5) important considerations in scheduling maintenance work. | 5. Participants will examine a case study and make one (1) suggestion for improving the method of scheduling work.                    |

Content

Scheduling, Planning, and Estimating Maintenance Work

All maintenance work, whether it requires skilled or non-skilled craftsmen, should be properly planned. The maintenance manager has the responsibility for doing such planning. Prerequisite qualities of a good maintenance manager include:

- (1) maintenance experience,
- (2) the ability to write and speak clearly,
- (3) the ability to analyze maintenance problems, and
- (4) the ability to successfully implement the various steps of the maintenance planning process: investigation, examination, selection, and review.

Upon receiving a work order, the planner should immediately investigate to determine what must be done to complete it. This involves writing a description of the work needed to be done. This ranges from changing a washer to major repairs. It may involve preparing or reviewing drawings and sketches to show or convey information concerning the best procedures or alternatives to follow for major repairs. The planner should then prepare a list of all materials required for the job. Such a list should include all parts obtainable from the stockroom as well as parts or materials which may need to be purchased. If parts need to be purchased, the planner should make the contacts to place orders. He should record delivery dates along with purchase order numbers.

Other considerations in maintenance planning include: personnel and time required to do each particular job; special equipment and tools needed; and relevant fire, safety, or OSHA (Occupational Safety and Health Administration) provisions.

#### Coordinating and Estimating

Whenever maintenance plans are developed, the planner should coordinate closely with the maintenance foreman. The planner should always discuss in detail the specific approach required with the maintenance foreman who will be doing the job.

Estimating is the process of predicting cost. Estimating is closely linked with planning, since planning forecasts or estimates the work, labor, and materials needed to do a job. Estimates must be accurate; often by the time that actual costs can be identified and accounted for, funds have already been appropriated and committed.

Jobs can be estimated once they have been broken down into their elements and required materials. In estimating, the estimator must allow

for all non-productive tasks that a worker must do in carrying out a job, such as:

- (1) travel to and from a job,
- (2) uncovering and covering work,
- (3) personal fatigue,
- (4) reading instructions, and
- (5) minor delays.

It is easier to estimate material costs for maintenance and repair work than labor costs. Once materials have been identified, their actual costs can be easily quantified.

#### Scheduling

Scheduling maintenance work can be difficult, especially when there is an absence of historical data concerning the number of maintenance employees required for any maintenance job or area. Schedules should always be chosen with a realistic concept of the time and materials required. Most desirable times should never be used as a basis for setting schedules; preferably an accurate assessment of required hours of labor and waiting times should be used. Schedules should always remain flexible. In preparing a schedule, the schedule should consider all requirements for a job, including materials, tools, supplies, and labor.

Effective scheduling begins with a good work order system. Each day, new work orders should be distributed to each of the specialized maintenance areas. If new work orders must take some type of priority over older ones, they should be placed in order of their priority. A foreman in each specialized maintenance area should maintain a work backlog file and distribute the daily workload to each worker under his supervision.

A scheduler should also know what personnel are available to complete a task. During periods of shut-downs, vacation, or holidays, fewer maintenance personnel will be available: and jobs or tasks will take longer for completion. The person responsible for maintenance scheduling should be familiar with any backlog that might exist.

The person responsible for maintenance scheduling should also have information on the availability of materials and parts needed to carry out maintenance functions. He also requires information about the amount and types of all required materials to complete a work order and information about the availability of parts or supplies.

One hundred percent (100%) of a work force should not be scheduled to do a particular maintenance function unless absolutely necessary. It is always good to reserve some of the work force for emergencies. The amount of reserve needed will depend on:

- (1) the location of the project,
- (2) the size of the project,
- (3) the availability of external help,
- (4) the availability of present employees,
- (5) skills or crafts to be employed, and
- (6) the time the job is to be completed.

It is good practice to maintain a backlog of at least one work week ahead of specific maintenance work orders which have been planned, estimated, and scheduled.

Good scheduling practice involves setting up a simple schedule board. The board should list the work order number, schedule of events, and actual progress. Schedule boards should be organized to suit individual

needs and should be attended to and updated on a daily basis. A visible card file system, providing the same information, should be used instead of a schedule board when the number of jobs is great or when the nature of most jobs is minor.

Methodology

1. This material should be presented in an informal lecture.

Resources

1. Workshop staff should conduct the informal lecture.

GOAL AREA 2:

TO ENABLE MANAGERS TO DESIGN A FUNCTIONAL  
MAINTENANCE MANAGEMENT SYSTEM

GOAL AREA 2: TO ENABLE MANAGERS TO DESIGN A FUNCTIONAL MAINTENANCE  
MANAGEMENT SYSTEM

LEARNING OBJECTIVES

ANTICIPATED PRACTICE OUTCOMES

- |  |   |
|--|---|
| 1. Participants will list six (6) important elements of a work order system.                                     | 1. Participants will examine a case study and establish a working system for work orders.   |
| 2. Participants will list four (4) practical considerations for using maintenance work orders.                   | 2. Participants will examine a case study and make one (1) suggestion for improving the method of using maintenance work orders.                                |
| 3. Participants will list two (2) options for accurately reporting work time expended in completing work orders. | 3. Participants will examine a case study and make one (1) suggestion for improving the way maintenance workers report time expended in completing work orders. |

Content

Maintenance Work Order Format

Most successful maintenance departments utilize the work order system.

Work orders:

- (1) initiate job actions and give instructions for starting a job,
- (2) provide information needed for cost control, and
- (3) provide feedback for departmental record keeping.

A good work order system insures that:

- (1) work orders are approved by authorized persons:
- (2) no work can begin, except in emergencies, unless proper approval has been obtained;
- (3) a standard form is used by all authorized sources, and
- (4) all work orders are first received in the maintenance department by a central clearinghouse which acts as the control center for the maintenance department.

Maintenance work orders should be printed in a standard form. Punch cards used for data processing can also be utilized for work orders.

The standard form should include the following items to be filled out by authorized managerial personnel:

- a code or filing number
- the date of issuance
- the date and time of required necessary action
- place for signature of issuing authority
- description of equipment necessary to do the job
- charge account number
- description of work to be performed or problem to be solved
- availability of equipment, shift, or time.

The standard form should also include the following items to be filled out by maintenance supervisory personnel:

- the required crafts (such as electrical work, carpentry, or plumbing) and the estimate of the time the job is to be completed by the craft doing its part of the maintenance job,
- the special tools or materials required for the job,
- the work that was performed by maintenance personnel,
- the total hours actually required for each craft,
- the date and time the work was started,
- the date and time the work was finished,
- the signature of the maintenance foreman.

The amount and type of work that any position can authorize should be clearly outlined before a system is put into operation.

#### Coding of Maintenance Work Orders

Classifying all work conducted by the maintenance department enables management to make an accurate analysis of maintenance costs. It also helps management organize many of the repetitive preventive maintenance

functions so that routine operations are carried out at regular intervals.

Below is an illustrative coding sample:

1:00 Preventive Maintenance

1:11 Inspection, adjustment  
1:21 Lubrication  
1:31 Replacement of worn parts  
1:41 Cleaning

2:00 Repair

2:11 Emergency repair  
2:21 Routine repair - not preventive maintenance

3:00 Safety

4:00 New construction

4:11 Installation  
4:21 Modification

5:00 Major renovation

#### Using Maintenance Work Orders

Work orders should be pre-numbered for easy identification and record keeping. The recommended procedure for using maintenance work orders is as follows:

- (1) The work order is received by the maintenance department,
- (2) The maintenance foreman clears the order and performs the necessary planning and scheduling,
- (3) The work order is passed on to the appropriate party in the maintenance department by the maintenance foreman or housing manager,
- (4) The work is completed, and
- (5) The work order is returned to the maintenance control, where it is analyzed and properly recorded in the finished work file.

If the maintenance department is large, it is helpful to utilize multi-part work order forms. Such forms facilitate coordination when different individuals are involved in the same job.

### Accurately Reporting Work Time Expended

The work time expended against every work order should be accurately reported so that meaningful cost reports can be established by the maintenance department. It is generally impractical to use the work order system for such time keeping. Some maintenance departments use a job ticket reporting system in conjunction with time clocks. When clocks are inconveniently located and cause personnel to expend considerable amounts of time in reaching them, such a system becomes less desirable. The most common system for reporting work time is the weekly time card system. This system requires the worker to carry the card with him to each job and to make the appropriate entry when the job is completed. Training is required to get employees to fill out cards properly and accurately, to handle them carefully, and to submit them promptly to management.

### Methodology

1. This material should be presented in an informal lecture.

### Resources

1. Workshop staff should conduct the informal lecture.

GOAL AREA 3

TO ENABLE MANAGERS TO FUNCTIONALLY  
CONTROL A MAINTENANCE DEPARTMENT  
AND BUDGET MAINTENANCE EXPENDITURES

GOAL AREA 3: TO ENABLE MANAGERS TO FUNCTIONALLY CONTROL A MAINTENANCE DEPARTMENT AND BUDGET MAINTENANCE EXPENDITURES

LEARNING OBJECTIVES

ANTICIPATED PRACTICE OUTCOMES

- |   |   |
|---|---|
| 1. Participants will list two (2) elements of the work sampling technique for measuring work performance.                 | 1. Participants will examine a case study and make two (2) suggestions for measuring work performance according to the work sampling technique. |
| 2. Participants will list three (3) elements of the job slotting technique for measuring work performance.                | 2. Participants will examine a case study and make two (2) suggestions for measuring work performance according to the job slotting technique.  |
| 3. Participants will list four (4) elements of the standard data technique for measuring work performance.                | 3. Participants will examine a case study and make two (2) suggestions for measuring work performance according to the standard data technique. |
| 4. Participants will list four (4) factors to consider in developing standard or basic time values for maintenance tasks. | 4. Participants will examine a case study and suggest one (1) technique for estimating standard time values.                                    |
| 5. Participants will list three (3) important elements of maintenance budgets.  | 5. Participants will list three (3) steps to take in preparing maintenance budgets.   |

Content

Setting Maintenance Goals

A good goal for maintenance performance should be around 85%. If a maintenance department consistently falls in the 80-85% range, it is doing an excellent job. To increase maintenance effectiveness to 90% or more, management generally has to provide some incentive pay.

Maintenance managers should employ a performance measuring system. Such a system plots the performance of various crafts on a chart. It allows the manager to immediately discern any unusual shift in performance

and thus focus attention on areas showing performances that are falling off.

#### Work Sampling Technique

The work sampling technique is one method for measuring work performance. It requires numerous observations of many maintenance workers. The observers record the amount of time the worker works productively, as well as noting the cause for idleness. The results of such a series of observations gives an approximate measure of the overall performance of the group being observed. One problem with this technique is that it does not measure results; it only measures time on the job and evaluates whether such time appears to be productive or non-productive. Another problem with this technique is that once workers know that they are being observed they may immediately change their work habits to both alter the observer's data as well as to mislead or confuse him. For these reasons, work sampling should only be used as a supplementary method of measuring work performance in conjunction with other control programs.

#### Job Slotting Technique

Job slotting is another technique to consider for measuring work performance. It consists of studying and developing engineering work standards for repetitive and non-repetitive maintenance jobs. Jobs selected are of various time lengths, covering the likely range of jobs that are normally carried out. Such jobs become benchmark jobs for setting time standards. From such jobs, estimators can closely approximate the time required to carry out any job in future situations. For example, if an estimator was interested in developing a time estimate for changing the four wheels on a truck, he could consider changing one wheel as the

benchmark job, and multiply the time required to perform the benchmark job to obtain a good estimate for the job as a whole.

The problems with job slotting as a method for measuring work performance are that beginning costs are high and that the method does not automatically adjust itself to new techniques or work habits.

#### Standard Data Technique

The standard data technique for measuring work performance is both accurate and thorough. Its drawbacks are that it is expensive to install and that it requires considerable time to implement. This technique requires that time standards be developed based on three concepts:

- (1) A fair day's work - This concept holds that when standard values are applied to a typically representative group of workers, they can obtain a level of productivity approximately 33% above the 100%. This assumes that workers are properly trained, work under good conditions, and have proper incentives.
- (2) Rate of accomplishment - This concept holds that work time will vary inversely with the rate of accomplishment. As the rate of accomplishment increases, the work time will correspondingly decrease.
- (3) Rest allowance - This concept accepts a variable proportion of rest time. Rest factors can be developed which provide for personal time and relaxation to cover any task. For example, if a mechanic must consistently walk from the spare parts room to the job, some of the time spent in walking must allow for rest and relaxation. Although such values are arbitrary, arbitrariness is diminished when they are consistently applied.

In utilizing the standard data technique, all activities which usually occupy a working day must be considered and identified. Jobs should be divided into useful work (productive work, indirect work, and travel) and lost work (delay time). With some thought, a maintenance manager can develop a chart of work activities which relates a standard job to a scheduled job.

Standard or basic time values should be developed for each part of useful work, analyzing each task performed by every skill or craft. The application of standard data takes on the following steps:

- (1) identification of the general characteristics of the job,
  - (a) location,
  - (b) craftsmen or skill involved,
  - (c) work order, and
  - (d) date.
- (2) Determination of whether work still needs to be completed or has already been completed,
- (3) breakdown of work into basic operations, listing working elements,
- (4) establishment of variables needed to identify the proper standard time value,
- (5) estimation of quantities involved (trips, inches, square feet, prices),
- (6) consideration of special factors,
  - (a) special conditions,
  - (b) manning or craft allowances, and
  - (c) job height.
- (7) Selection of the bulletin number of an applicable standard data operation,

- (8) Selection and posting of a standard time,
- (9) accumulation of total standard time, and allowance for establishment of total time allowed for the job,
- (10) computation of actual man-hours charged to the job, and
- (11) calculation of the performance of the job as a percentage of standard by dividing standard time by actual time.

The cost per standard hour is a useful measure which will show how improvements in operation lower maintenance costs.

$$\text{Cost/Standard Hour} = \frac{\text{Time Direct Payroll Dollars}}{\text{Equivalent Standard Hours}}$$

For example, if a maintenance department with a total direct payroll of \$200,000 performed 30,000 standard hours during a given month, the cost per standard hour could be calculated thusly:

$$\text{Cost/Standard Hour} = \frac{\$200,000}{50,000 \text{ hours}} = \$4.00/\text{hour}$$

With this type of management control, the maintenance manager or housing manager has the information needed to analyze and evaluate the results of an improvement program.

#### Budget Requirements for Maintenance

In constructing a maintenance budget, the manager must first determine the requirements for maintenance and then develop costs based on these requirements. The budget is the maintenance manager's best estimate of expected expenditures during the upcoming year. To every maintenance manager, the budget is both a plan to be followed and a yardstick for measuring performance.

Budgets should be realistic. They should reflect actual plans and never be based on wishful thinking. If a budget is well prepared, it

becomes a very effective tool for control of the maintenance operation.

Preparing a budget consists of identifying required labor and materials and then applying proper overhead factors. In implementing this process, maintenance needs must first be identified. These needs are converted into person hours by craft, a classification of skills such as electricians, machinists, pipefitters, and painters. Such needs may vary throughout the budget period due to heavy demands in one month and normal or light demands in others.

#### Annualizing and Calculating Costs

In small operations, it is common to annualize required hours and treat such an estimate as a fixed cost. This results in charges of a set amount per month as a fixed charge. Since demands for maintenance services vary each month, a variable maintenance budget is preferable.

The maintenance department budget can be broken down into a fixed and a variable budget. Each area of a maintenance department can be broken down into a fixed or variable cost factor. Fixed costs are costs that arise in certain situations which call for a regular input of person hours, supplies, or both. Costs for janitors, painters, and cleaners are usually fixed, since it is easy to assume how many hours will be needed in such areas and to estimate the annual wages, supplies, and overhead costs for such areas. The fixed charge per hour for janitorial services or for painting and cleaning services could be calculated using the following formula:

$$\text{Charge/Janitorial} = \frac{\text{(Annual) Wages} + \text{(Annual) Supplies Cost} + \text{(Annual) Overhead}}{\text{Hour Services (Annual Hours)}}$$

Services which require variable cost figures include mechanics, pipefitters, electronic technicians, and electricians. The time and cost for such services vary, depending on estimated needs and requirements during the month and year.

Methodology

1. This material should be presented in an informal lecture.

Resources

1. Workshop staff should conduct the informal lecture.

GOAL AREA 4

TO ENABLE MANAGERS TO ESTABLISH MAINTENANCE  
STAFFING, PERSONNEL, AND TRAINING GUIDELINES

GOAL AREA 4: TO ENABLE MANAGERS TO ESTABLISH MAINTENANCE STAFFING, PERSONNEL, AND TRAINING GUIDELINES

<u>LEARNING OBJECTIVE</u>	<u>ANTICIPATED PRACTICE OUTCOME</u>
1. Participants will cite the three (3) basic types of training for maintenance personnel.	1. Participants will select the appropriate training modality for three (3) hypothetical employees.

Content

Education and Training

There are basically three types of training for maintenance workers:

- (1) apprenticeship,
- (2) special courses, and
- (3) concurrent upgrading.

An apprenticeship is a long-range program. An apprentice is trained, over a two to four year period, to perform a skilled maintenance job while being paid. Sometimes there may be an agreement whereby the apprentice, upon becoming a journeyman, will remain for a certain number of years with the organization after completion of the apprenticeship program.

Usually an apprentice is assigned to work with a journeyman or an experienced craftsman. In addition, the apprentice is given classroom instruction courses covering general subjects such as mathematics, drafting, electricity, and hydraulics.

Apprenticeship applicants are generally at least high school graduates, between 18 and 25 years of age. Applicants are generally screened for mental and physical ability.

General concurrent upgrading programs are extremely important for existing employees, especially in the case of older employees. Such

programs cover new technologies or methods and provide employees with an opportunity to upgrade skills and prepare for higher grade positions. Upgrading programs are particularly helpful for training foremen and group leaders. Periodic sessions should be held for senior employees to practice leadership and management techniques.

Methodology

1. This material should be presented in an informal lecture.

Resources

1. Workshop staff should conduct the informal lecture.

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POST-TEST

POST-TEST: WHAT DID YOU LEARN?

1. List four prerequisite skills for maintenance planning.

(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

(d) \_\_\_\_\_

2. Below the boxes are listed the major steps in maintenance planning. Place these steps in the appropriate box, in the appropriate order.



Examination  
Review  
Investigation  
Selection

3. List two (2) steps that need to be taken upon receiving a work order:

(a) \_\_\_\_\_

(b) \_\_\_\_\_

4. Place a check next to those items which are important factors to consider in estimating work.

- \_\_\_\_\_ a. Supervisory time
- \_\_\_\_\_ b. Travel to and from a job
- \_\_\_\_\_ c. Personal fatigue
- \_\_\_\_\_ d. Uncovering and covering work
- \_\_\_\_\_ e. Personal interruptions
- \_\_\_\_\_ f. Reading instructions
- \_\_\_\_\_ g. Minor delays

5. List five (5) elements of an effective maintenance scheduling system.

- (a) \_\_\_\_\_
- (b) \_\_\_\_\_
- (c) \_\_\_\_\_
- (d) \_\_\_\_\_
- (e) \_\_\_\_\_

6. Answer True (T) or False (F) to the following items:

- \_\_\_\_\_ (a) Work orders provide both job instructions and information needed for cost control and record keeping.
- \_\_\_\_\_ (b) Every work order should always be approved by an authorized authority before any job is begun.
- \_\_\_\_\_ (c) Maintenance staff should be responsible for assigning proper cost account numbers to work orders.
- \_\_\_\_\_ (d) Maintenance work orders should be coded to aid in analyzing maintenance costs and in scheduling routine activities.
- \_\_\_\_\_ (e) All work orders should first be received in the maintenance department.
- \_\_\_\_\_ (f) Management should identify the special tools required for a job on the work order.

7. Below are listed the steps involved in using maintenance work orders.

- (a) The work order is passed on to the appropriate party in the maintenance department by the maintenance foreman or housing manager;
- (b) The work is completed;
- (c) The work order is received by the maintenance department;
- (d) The work order is returned to the maintenance control, where it is analyzed and properly recorded in the finished work file;
- (e) The maintenance foreman clears the order and performs the necessary planning and scheduling.

Place them in the correct order:

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

8. List two (2) options for accurately reporting the work time expended in completing job orders:

(a) \_\_\_\_\_

(b) \_\_\_\_\_

9-10-11. Below are listed the elements of various techniques for measuring work performance. Place a (MS) next to those that relate to the work sampling technique; a (JS) next to those that relate to the job slotting technique, and an (SD) next to those that relate to the standard data technique.

- \_\_\_\_\_ (a) Involves developing engineering work standards for repetitive and non-repetitive jobs.
- \_\_\_\_\_ (b) Does not measure results of time spent on a job; only a qualitative evaluation if such time is productive.
- \_\_\_\_\_ (c) Once implemented, the most effective method for measuring work performance.
- \_\_\_\_\_ (d) Benchmark jobs are used to set time standards.
- \_\_\_\_\_ (e) Based on fair day's work, rate of accomplishment, and rest allowance.
- \_\_\_\_\_ (f) Considers productive work, indirect work, travel time, and delay time.
- \_\_\_\_\_ (g) High initial costs/no automatic adjustment to new techniques or work habits.
- \_\_\_\_\_ (h) Observing a sample of many workers gives an approximate measure of the overall group.
- \_\_\_\_\_ (i) Develops basic time values for each component part of a job.

12. List four (4) factors to consider in developing standard or basic time values for maintenance tasks:

(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

(d) \_\_\_\_\_

13. Answer True (T) or False (F) to the following items:

- \_\_\_\_\_ (a) Budgets are plans to be followed.
- \_\_\_\_\_ (b) Preparing a budget consists of identifying required labor and identifying required materials.
- \_\_\_\_\_ (c) Budgets should be as realistic as possible.
- \_\_\_\_\_ (d) Budgets are yardsticks for measuring performance.
- \_\_\_\_\_ (e) Charge/service =  $\frac{\text{Annual Hour} \quad \text{Annual Wages} + \text{Cost of Supplies}}{\text{Annual Hours}}$

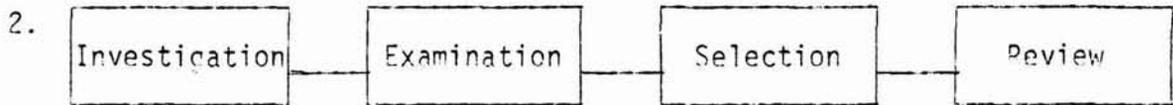
14. Match the following kinds of training with their definition:

- |                            |  |
|----------------------------|--|
| _____ Apprenticeship       | a. Classroom instruction   |
| _____ Special Courses      | b. Long-range paid training  |
| _____ Concurrent upgrading | c. Particularly helpful for senior staff/often focus on leadership and management skills |

ANSWERS TO POST-TEST

ANSWERS TO POST-TEST

1. (a) maintenance experience  
(b) the ability to write and speak clearly  
(c) the ability to analyze maintenance problems  
(d) the ability to carry out the maintenance planning process



3. (a) Determine what must be done to complete it.  
(b) Prepare a list of materials required for the job.
4. a, b, c, d, f
5. (a) A good work order system.  
(b) Knowledge of available personnel.  
(c) Knowledge of available parts and materials.  
(d) Provision for work force reserve.  
(e) A schedule board.
6. (a) True  
(b) False...Emergency conditions excepted.  
(c) False...This is a management task.  
(d) True  
(e) True  
(f) False...The task is appropriate for the maintenance supervisor.
7. c, e, a, b, d
8. (a) job ticket/time clock  
(b) weekly time cards
- 9-10-11. (a) JS  
(b) MS  
(c) SN  
(d) JS  
(e) SD  
(f) SD  
(g) JS  
(h) MS  
(i) SD

12. (a) General job characteristics  
(b) Completion status  
(c) Breakdown of basic operations  
(d) Variables needed to identify proper standard time value  
(e) Quantities involved  
(f) Special factors  
(g) Applicable standard data operation  
(h) Selection and posting of standard time  
(i) Accumulation of total standard time and allowance for total time allowed in job  
(j) Computation of actual man hours charged to a job  
(k) Calculation of job performance as a percentage of standard by dividing standard time by actual time
13. (a) True  
(b) False...Overhead factors must also be applied  
(c) True  
(d) True  
(e) False...Charge/service =  $\frac{\text{Annual hour}}{\text{Annual Wages + Cost of Supplies + Annual Overhead}} \times \text{Annual Hours}$
14. b, a, c

SKILL-TEST

SKILL-TEST: CAN YOU USE WHAT YOU HAVE LEARNED IN WORK SITUATIONS?

1. *Which of the following candidates is most appropriate for the job of a maintenance supervisor?*

- \_\_\_\_\_ (a) Joe Smith has worked in the maintenance department for ten years.
- \_\_\_\_\_ (b) Juan Hernandez worked as a maintenance supervisor in Puerto Rico for five years. He just moved to the mainland a few months ago and has some problems with his English.
- \_\_\_\_\_ (c) Jack Roberts has worked as an assistant maintenance supervisor for a year and a half. He has experience in analyzing maintenance problems.
- \_\_\_\_\_ (d) Chuck Brown has worked in the maintenance department for three years. His attitude and work record are both very good; he has successfully assisted the maintenance supervisor on occasion.

*What criteria did you use in selecting the best candidate?*

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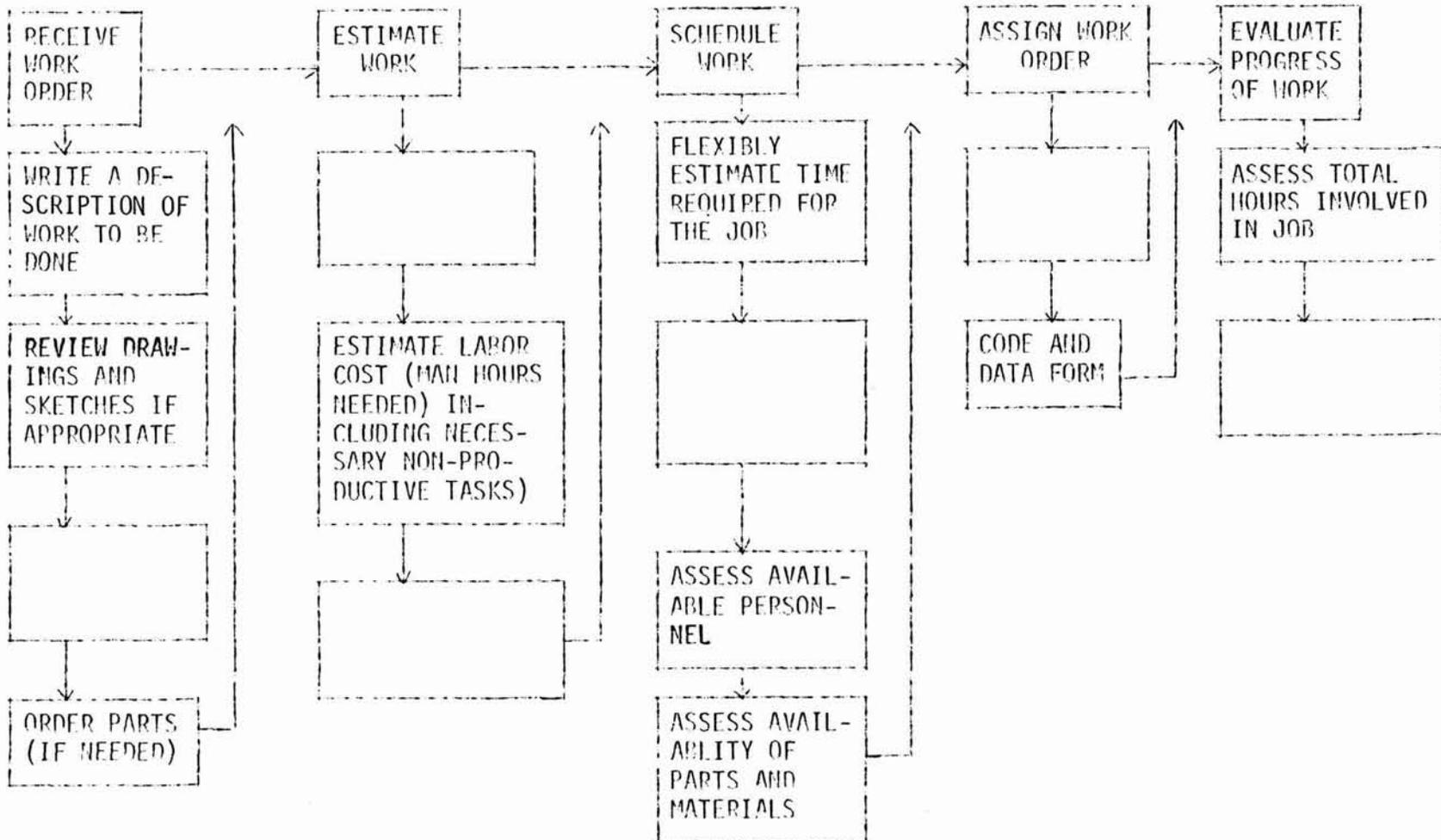
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2-3-4-5-6-7-8. Read the following case study:

You are the maintenance supervisor in a large housing development. The director of your housing authority requires that you implement a comprehensive plan for estimating, scheduling, and managing maintenance jobs. He provides you with the outline of a planning matrix. Complete the missing parts:



9-10-11-12. *Briefly discuss how you would evaluate the job performance of a painting crew according to the following techniques:*

(a) Work Sampling

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(b) Job Slotting

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(c) Standard Data

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13. *List five (5) steps involved in preparing a maintenance budget:*

- (a) \_\_\_\_\_
- (b) \_\_\_\_\_
- (c) \_\_\_\_\_
- (d) \_\_\_\_\_
- (e) \_\_\_\_\_

14. *Cite an appropriate training modality for the following workers:*

(a) Maintenance staff need to learn appropriate procedures for maintaining and fixing the new washers and dryers.

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(b) Several unskilled high school graduates are assigned to a maintenance department.

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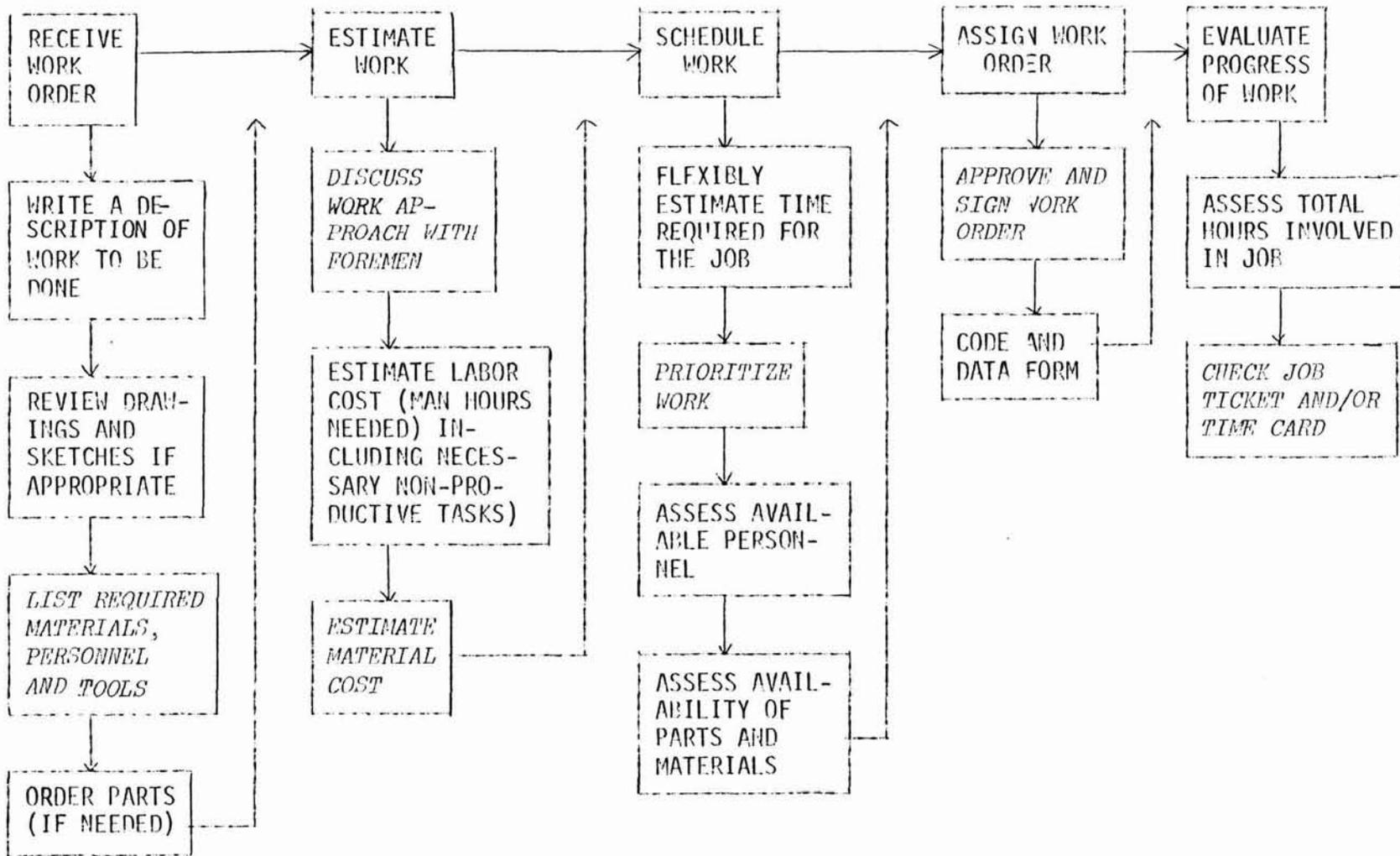
(c) The maintenance foreman needs training in leadership and management practices.

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ANSWERS TO SKILL TEST

1. (c) Jack Roberts is the strongest candidate. He does best when measured against the criteria for a good maintenance supervisor:
  - maintenance experience
  - the ability to write and speak clearly
  - the ability to analyze maintenance problems
  - the ability to successfully implement the various stages of maintenance planning

2-3-4-5-6-7-8. Participants were asked to complete the following matrix:



- 9-10-11-12. (a) Record the amount of time many workers require to perform a task; note cause for idleness. From such a series of observations, an approximate measure of overall performance can be made.
- (b) Study and develop engineering work standards for repetitive and non-repetitive maintenance jobs, of various lengths, covering the range of jobs normally carried out. Establish time standards from such bench mark jobs.
- (c) Establish a standard value for a fair day's work, allowing for rest time and rate of accomplishment. Analyze general job characteristics, break down into basic work operations, estimate standard time.

$$\text{Cost/Standard Hour} = \frac{\text{Total Direct Payroll Dollars}}{\text{Equivalent Standard Hours}}$$

13. (a) identify maintenance needs  
(b) identify required labor  
(c) identify required materials  
(d) apply overhead factors  
(e) annualize and calculate costs
14. (a) special courses  
(b) apprenticeship  
(c) concurrent upgrading

PART II  
SERVICE CONTRACTS FOR HOUSING MANAGERS

TABLE OF CONTENTS

	<u>PAGE</u>
PART II	
SERVICE CONTRACTS FOR HOUSING MANAGERS	
I. INTRODUCTION	42
II. HOW TO USE THE INSTRUCTOR'S GUIDE	44
III. WORKSHOP MATRIX	46
IV. CONTENT	50
GOAL AREA	
On-site and Contractual Maintenance	50
On-site Maintenance	51
Contractual Maintenance	52
Evaluating Bids	52
Advantages and Disadvantages of Service Contracts	53
Performance Standards for Contracts	53
V. POST-TEST	55
Answers to Post-Test	58
VI. SKILL-TEST	59
Answers to Skill-Test	64

INTRODUCTION  
TO PART II  
SERVICE CONTRACTS FOR HOUSING MANAGERS

In order to effectively maintain a housing development, housing managers need the assistance of outside contractors. Both small and large developments need to call upon contractual agreements for emergency situations, for times when staff cannot handle an overload, and for situations which demand specialized professional attention. The overall goal of this workshop is to acquaint housing managers with the appropriate situations for utilizing the services of a contractor, the methods for locating a contractor and for binding an agreement, and the pros and cons of using contracting services.

Accordingly, Part II of the Workshop has seven learning objectives:

- (1) Participants will identify five (5) services that may be contracted out in the daily operations of a housing development,
- (2) Participants will define two (2) categories of maintenance tasks,
- (3) Participants will list four (4) ways to advertise for service contracts,
- (4) Participants will list five (5) items to include in preparing a bid request,
- (5) Participants will cite three (3) important considerations in evaluating bids,
- (6) Participants will list two (2) advantages and two (2) disadvantages of service contracts, and
- (7) Participants will list two (2) contractor and two (2) management performance standards for contracts.

These learning objectives are, simply, measurable statements about the specific knowledge participants are expected to acquire in the workshop.

Each learning objective, in turn, has what is called an anticipated practice outcome. Anticipated practice outcomes are those practical skills a participant can be expected to implement on the job using the information acquired in the workshop.

In other words, anticipated practice outcomes refer to the ways knowledge acquired in the workshop can be applied to real problems and situations.

Part II of this workshop, organized around the learning objectives and anticipated practice outcomes, requires one half day session.

### HOW TO USE THE INSTRUCTOR'S GUIDE

This is the Instructor's Guide to Part II of the workshop: Service Contracts for Housing Managers. In addition to listing a goal, learning objectives, and anticipated practice outcomes, it contains a detailed content section, and discusses appropriate methodology and resources. It also provides answers to the post-test evaluation and suggests criteria for evaluating results of the skill-test items.

The Participant's Workbook for the workshop contains the same introduction and description of the goal, learning objectives and anticipated practice outcomes. However, the content and methodology are less detailed and only those materials required for participants in the post-test and skill-test are included.

The workshop is organized around learning objectives and anticipated practice outcomes. The overall workshop plan is presented in the matrix on pages 46 through 48.

At the top of each page is a box containing the overall problem. At the far left of each page is the overall goal of the workshop. The goal states in broad terms how the workshop will address the problem.

To the right of the goal statement are seven learning objectives. These objectives represent specific knowledge a participant is expected to acquire during the workshop.

In the next column to the right, under "Content," is a list of the material to be covered for each goal.

Moving farther right, the next column contains methodology. Outlined in this column are the teaching methods suggested for the workshop. In

this workshop informal discussion will be used.

The next column, labeled "Resource," contains a description of who will conduct the course. For this workshop, program staff can be used.

The next column to the right lists those corresponding post-test items which will measure how well participants met the learning objectives.

This column is followed by the anticipated practice outcomes, which are more practical, job-related skills or attitudes the participant is expected to acquire.

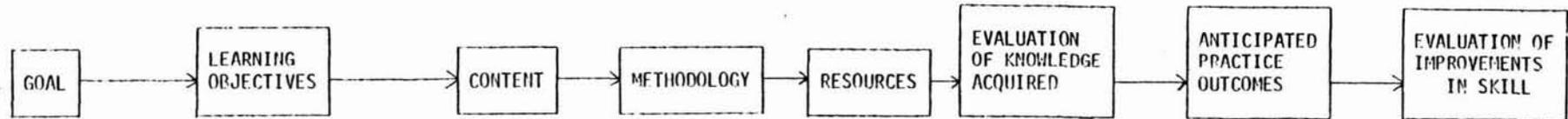
Finally, the last column on each page lists corresponding skill-test items which will measure how well participants met the anticipated practice outcomes.

WORKSHOP MATRIX

WORKSHOP MATRIX

PROBLEM

Managers need a comprehensive understanding of service contracts: what they are, when to solicit them, how to choose the best one among various bids, and how to monitor and evaluate them.

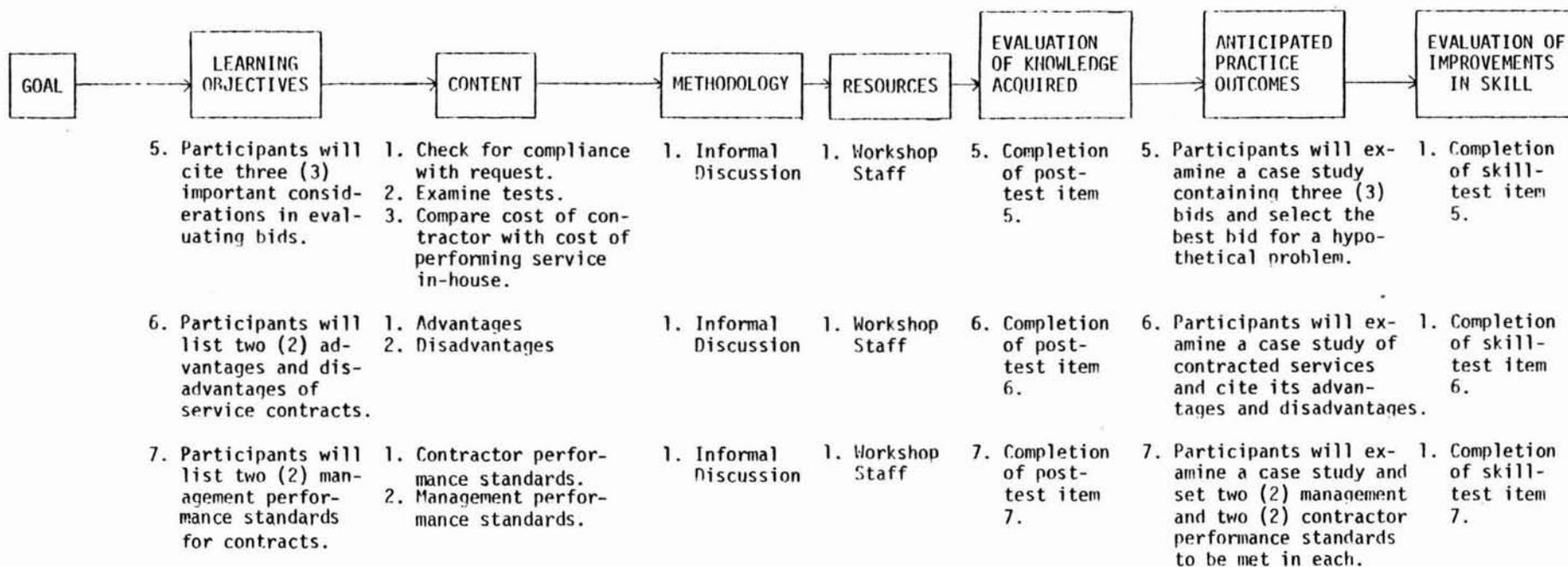


GOAL	LEARNING OBJECTIVES	CONTENT	METHODOLOGY	RESOURCES	EVALUATION OF KNOWLEDGE ACQUIRED	ANTICIPATED PRACTICE OUTCOMES	EVALUATION OF IMPROVEMENTS IN SKILL
1. To acquaint managers with the appropriate situations for utilizing the services of a contractor, the methods for locating a contractor and for binding an agreement, and the pros and cons of using contracting services.	1. Participants will identify five (5) services that may be contracted out in the daily operations of a housing development. 2. Participants will name two (2) categories of maintenance tasks. 3. Participants will list four (4) ways to advertise service contracts. 4. Participants will list five (5) items to include in preparing a bid request.	1. Examples of services.  1. On-site maintenance. 2. Contractual maintenance.  1. Newspaper 2. Radio 3. Television 4. Mail 5. Magazine  1. Task to be performed. 2. Frequency required. 3. Type of equipment involved. 4. Products desired. 5. Personnel required.	1. Informal Discussion  1. Informal Discussion  1. Informal Discussion  1. Informal Discussion	1. Workshop Staff  1. Workshop Staff  1. Workshop Staff  1. Workshop Staff	1. Completion of post-test item 1.  2. Completion of post-test item 2.  3. Completion of post-test item 3.  4. Completion of post-test item 4.	1. Participants will examine ten (10) case study problems and determine if they should be contracted out or handled by maintenance staff.  2. Participants will define the important elements of the two (2) categories of maintenance tasks.  3. Participants will examine ten (10) case study problems and select the best advertising medium for each.  4. Participants will examine a hypothetical bid request and make two (2) suggestions for its improvement.	1. Completion of skill-test item 1.  1. Completion of skill-test item 2.  1. Completion of skill-test item 3.  1. Completion of skill-test item 4.

WORKSHOP MATRIX

PROBLEM

Managers need a comprehensive understanding of service contracts: what they are, when to solicit them, how to choose the best one among various bids, and how to monitor and evaluate them.



GOAL AREA:

TO ACQUAINT MANAGERS WITH THE APPROPRIATE SITUATIONS FOR  
UTILIZING THE SERVICES OF A CONTRACTOR, THE METHODS FOR  
LOCATING A CONTRACTOR AND FOR BINDING AN AGREEMENT, AND  
THE PRO'S AND CON'S OF USING CONTRACTING SERVICES

GOAL AREA: TO ACQUAINT MANAGERS WITH THE APPROPRIATE SITUATIONS FOR UTILIZING THE SERVICES OF A CONTRACTOR, THE METHODS FOR LOCATING A CONTRACTOR AND FOR BINDING AN AGREEMENT, AND THE PROS AND CONS OF USING CONTRACTING SERVICES

LEARNING OBJECTIVES

ANTICIPATED PRACTICE OUTCOMES

- |  |   |
|--|---|
| 1. Participants will identify five (5) services that may be contracted out in the daily operations of a housing development. | 1. Participants will examine ten (10) case study problems and determine if they should be contracted out or handled by maintenance staff. |
| 2. Participants will name two (2) categories of maintenance tasks.   | 2. Participants will define the important elements of the two (2) categories of maintenance tasks.  |
| 3. Participants will list four (4) ways to advertise service contracts.  | 3. Participants will examine ten (10) case study problems and select the best advertising medium for each.                                |
| 4. Participants will list five (5) items to include in preparing a bid request.  | 4. Participants will examine a hypothetical bid request and make two (2) suggestions for its improvement.                                 |
| 5. Participants will cite three (3) important considerations in evaluating bids.   | 5. Participants will examine a case study containing three (3) bids and select the best bid for a hypothetical problem.                   |
| 6. Participants will list two (2) advantages and disadvantages of service contracts.   | 6. Participants will examine a case study of contracted services and cite its advantages and disadvantages.                               |
| 7. Participants will list two (2) contractor and two (2) management performance standards for contracts.                     | 7. Participants will examine a case study and set two (2) management and two (2) contractor performance standards to be met in each.      |

Content

On-Site and Contractual Maintenance

To complete various functions in a housing development, a manager needs the services of expert personnel or professionals. Maintenance personnel may not be capable of handling all work order assignments.

When this occurs, the housing manager should seek outside help in the form of an agreement called a service contract. Service contracts are agreements entered into by housing managers and one or more outside organizations for the purpose of performing specialized functions. Services that may be contracted in the operation of the housing development include emergency sewer service; maintenance of transformers; transformer poles, wiring, and related services; auditing and accounting; advertising; gas pipeline safety inspection; pest control; and so forth.

The housing manager has responsibility to provide for and monitor on-site and contractual maintenance. Certain maintenance tasks are generally handled on-site; however, seasonal and other periodic and energy maintenance tasks are often contracted out. A housing manager needs to be aware of maintenance costs for on-site and contractual maintenance in order to make the most cost effective decisions when buying maintenance supplies.

#### On-Site Maintenance

On-site maintenance is usually cost-effective when housing development personnel are able to perform the required tasks. The effectiveness of on-site maintenance is determined by the number of work orders completed. Small housing units usually hire maintenance personnel to perform routine, preventive, and responsive maintenance tasks. Depending upon the size of the housing development, a manager may need several types of service contracts. Usually, the capacity to perform a professional service such as pest control, electrical, painting, plumbing, gas maintenance, or detective service is not found within a housing development staff. Contractual maintenance is usually acquired for seasonal and

preventive maintenance. In large housing units, management generally provides for major maintenance tasks, and routine and responsive maintenance tasks are provided for on-site.

#### Contractual Maintenance

Contractual maintenance should be clearly planned and acquired by the housing manager, according to recommended guidelines. The standard way a service contract can be acquired in a housing development is through advertising for bids. Advertising for a service contractor is usually done in newspapers, on radio or television, or through the mail or magazines. Bidding is usually competitive and done secretly in a manner which allows managers to invite bids from several contractors. In asking for bid proposals, the manager should specify what he is asking for to enable a potential contractor to give a realistic price or time schedule. In preparing a bid request, the manager should include the following information: the task to be performed, the frequency required, the make and model or type of equipment involved, the type and amount of materials or equipment desired, the types of personnel required, and the types and amount of materials and/or equipment the manager will be held responsible to provide. With such information, a contractor can bid a realistic price.

#### Evaluating Bids

Before deciding which bid to accept, a manager should check each bid for compliance with the bid request. A manager should reject all bids that do not fit the specifications. Only those bids that are responsive to the needs of the housing development should be evaluated further for relative cost. BE CAUTIOUS OF THE LOWEST PRICE BID. Low-priced bids

may be underbids or may not meet the required contract specifications. Before the manager makes a final selection, he should compare the contractor's cost with the cost of providing the same service using his own maintenance personnel. Once the comparison has been made and a contractor selected, the manager should meet with him and arrange an operating procedure. At this time, specific terms of the contract can be discussed. If any problems exist with technical language, the housing development attorney should be consulted. Once technical jargon has been clearly understood by both parties, the manager should provide the contractor with all other necessary materials he may need to complete the job. On-going communication is necessary if the job is to go smoothly.

#### Advantages and Disadvantages of Service Contracts

There are advantages and disadvantages of service contracts. In times of emergency, a manager can get the assistance he needs without too much delay. In addition, the contractor is bound by contract to perform and complete the specified functions. At the same time, disadvantages of service contracts include the fact that once a contract has been signed, the manager cannot take advantage of possible discounts, and that charges for service contracts are usually higher in proportion to what it would cost maintenance personnel to carry out the same function if they were capable of doing so.

#### Performance Standards for Contracts

Both the contractor and the manager have performance standards for the performance of a job. Contractors expect cooperation from both the housing manager and the residents of the housing units. They should also have access to the facilities to be serviced, such as keys, water, or

other tools necessary to complete the job.

Management, in the supervision of the contractor's performance, should see that all deadlines are met, that the quality of the completed job is beyond reproach, and that there are penalties for non-performance or delays in work which are faults of the contractor.

#### METHODOLOGY

1. This material should be presented in an informal lecture/discussion. Participants should then be asked to complete the post-test and skill-test. Completion and review of these tests in the workshop setting will be a valuable learning experience.

#### RESOURCES

1. Workshop staff should conduct the informal lectures, the post-test and the skill-test.

POST-TEST

POST TEST: WHAT DID YOU LEARN?

1. *List five (5) services that may be contracted out in the daily operations of a housing development.*

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

e. \_\_\_\_\_

2. The two chief categories of maintenance tasks are \_\_\_\_\_  
and \_\_\_\_\_.

3. *List four (4) potential ways of advertising service contracts:*

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

4. *Which of the following should be included in a bid request? Check appropriate responses.*

\_\_\_\_\_ a. task to be performed

\_\_\_\_\_ b. estimated cost

\_\_\_\_\_ c. frequency required

\_\_\_\_\_ d. make and model of materials desired

\_\_\_\_\_ e. estimated number of competitors

\_\_\_\_\_ f. personnel required

\_\_\_\_\_ g. equipment manager will provide

5. *Below are three (3) important considerations in evaluating bids. Place them in the correct order.*

- a. Examine bids for relative costs
- b. Check for compliance with bid request
- c. Compare contractor cost to cost of using regular maintenance personnel
- d. Reject all bids that do not fit designated plans

6. *List two (2) advantages and two (2) disadvantages of service contracts:*

*Advantages:*

a. \_\_\_\_\_

b. \_\_\_\_\_

*Disadvantages:*

a. \_\_\_\_\_

b. \_\_\_\_\_

7. *Below are listed several performance standards for contracts. Place a (C) next to those that apply to contractors; place an (M) next to those that apply to managers.*

\_\_\_\_\_ a. Cooperation from residents

\_\_\_\_\_ b. Deadline should be met: penalties made if not

\_\_\_\_\_ c. Quality of work should be beyond reproach

\_\_\_\_\_ d. Access to items necessary for the job

ANSWERS TO POST TEST:

1.
  - a. emergency sewer service
  - b. outside floodlighting service
  - c. transformer service
  - d. transformer pole service
  - e. wiring service
  - f. auditing
  - g. accounting
  - h. advertising
  - i. consulting
  
2.
  - on-site
  - contractual
  
3.
  - a. newspapers
  - b. radio
  - c. television
  - d. mail
  - e. magazine
  
4. a, c, d, f, g
  
5. b, d, a, c
  
6.
  - a. Emergency assistance without delay
  - b. Contractual binding for completion of specific tasks
  - c. Once a contract is signed, the manager cannot take advantage of possible discounts.
  - d. contractual services usually cost more
  
7.
  - a. c
  - b. m
  - c. m
  - d. c

SKILL-TEST

SKILL TEST: CAN YOU USE WHAT YOU HAVE LEARNED IN WORK SITUATIONS?

1. Below are ten (10) situations that have arisen in a hypothetical housing development. Indicate whether they should be contracted out or handled by maintenance staff.

SITUATION	CONTRACT OUT	HANDLE WITH REGULAR MAINTENANCE STAFF
a. pest control		
b. cleaning of air conditioners		
c. gas leaks		
d. window cleaning		
e. installing storm windows		
f. detective service		
g. repairing faucets		
h. sewer service		
i. transformer service		
j. replacing light bulbs		
k. auditing		
l. painting		

2. a. Define on-site maintenance

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b. Define contractual maintenance

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3. *Select the best advertising media for the following types of contracted service:*

SERVICE	NEWSPAPER	TELEVISION/ RADIO	MAIL	MAGAZINE
a. Pest control work				
b. Electrical work				
c. Plumbing work				
d. Gas repairs				
e. Detective services				
f. Auditing services				
g. Sewer service				
h. Floodlighting service				
i. Accounting				
j. Consulting				

4. *Read the following hypothetical bid request.*

The Springfield Housing Development is seeking bids for one year of pest-control service for its three high-rise buildings. The housing authority will provide blueprints of all buildings, work with residents to gain their cooperation, and assure necessary access to all dwelling units. The contractor will be expected to use regulation equipment that complies with state standards and service each unit at least six times during the contract period. Bids must be submitted by March 1.

*Make two suggestions for improving this bid request.*

a. \_\_\_\_\_

b. \_\_\_\_\_

5. *Select the best bid to meet the requirements of the bid request in question 4.*

a. The Ace Pest Control Company will service each unit in the three high-rises once a month for a total cost of \$25,000.

b. The Acme Pest Control Agency will service each unit three times during the contract period for a total cost of \$15,000.

c. The Air-Tight Pest Control Agency will meet bid requirements at a total cost of \$14,000. Air-Tight is certified by the State Professional Association of Pest-Control Companies.

- (1) *On the basis of the above information only, which company should receive the contract?*

\_\_\_\_\_  
\_\_\_\_\_

(2) *What steps did you take in deciding?*

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

6. a. *What are the advantages of contracting out the work described in question 4?*

(1) \_\_\_\_\_

(2) \_\_\_\_\_

b. *What are the disadvantages of contracting out the work described in question 4?*

(1) \_\_\_\_\_

(2) \_\_\_\_\_

7. a. *Set two management performance standards for the work described in question 4.*

(1) \_\_\_\_\_

(2) \_\_\_\_\_

b. *Set two contractor performance standards for the work described in question 4.*

(1) \_\_\_\_\_

(2) \_\_\_\_\_

ANSWERS TO SKILL-TEST

1. Participants were asked to complete the following matrix:

SITUATION	CONTRACT OUT	HANDLE WITH REGULAR MAINTENANCE STAFF
a. pest control	X	
b. cleaning of air conditioners		X
c. gas leaks	X	
d. window cleaning		X
e. installing storm windows		X
f. detective service	X	
g. repairing faucets		X
h. sewer service	X	
i. transformer service	X	
j. replacing light bulbs		X
k. auditing	X	
l. painting		X

2. a. On-site maintenance involves hiring maintenance personnel to perform routine, preventive, and responsive maintenance tasks.
- b. Contractual maintenance involves hiring outside personnel on a temporary basis to perform specific, non-repetitive tasks.
3. Participants were asked to complete the following matrix:

SERVICE	NEWSPAPER	TELEVISION/ RADIO	MAIL	MAGAZINE
a. Pest control work	X	X		
b. Electrical work	X		X	
c. Plumbing work	X	X		
d. Gas repairs			X	
e. Detective services	X			X
f. Auditing services			X	X
g. Sewer service	X	X		
h. Floodlighting service	X			X
i. Accounting			X	
j. Consulting			X	X

4. a. There is no mention of the scope of problem.
- b. There is no mention of results desired - 50%, 75%, 100% reduction of the problem.

5. (1) a. Ace Pest Control Company
- (2) a. check for compliance with bid request
- b. reject bids that do not fit designated plans
- c. examine bids for relative costs
  
6. a. (1) lack of in-house expertise to do the job
- (2) less on-going administrative burden
- b. (1) contractual bind
- (2) high cost
  
7. a. (1) deadlines and standards should be met
- (2) quality of work should be good
- b. (1) cooperation from residents
- (2) access to units as required