Maintenance Management

Desk Reference Manual

U.S. Department of the Interior • National Park Service

PREFACE

This Desk Reference Manual has been prepared for the National Park Service under Contract No. CX0001-6-0004 to support the implementation and operation of Maintenance Management. It is intended to be a general reference document providing a summary overview of Maintenance Management procedures and applications.

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
MAINTENANCE MANAGEMENT

DESK REFERENCE MANUAL

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INTRODUCTION

BACKGROUND

Maintenance Management (MM) has been recognized as a real need by the National Park Service throughout the years. With over 330 individual and diverse park areas encompassing over 80 million acres of land, maintenance is big business and must be managed in an efficient and cost-effective manner.

Maintenance requirements increase as the park facilities age and as the use of park facilities increases. The costs to perform work are also increasing. Maintenance in park areas is also being impacted by pressures to reduce government spending at all levels. To address these issues, a Congressional Mandate was issued in 1984 for the National Park Service to implement Maintenance Management on a Servicewide basis.

The National Park Service was well aware of the need for Servicewide Maintenance Management as individual park areas had been developing various components of Maintenance Management in recent years. In response to the Congressional Mandate, a Maintenance Management Task Force and subsequent Steering Committee were established and charged with the responsibility to develop a framework and implementation plan for Servicewide Maintenance Management.

Servicewide Maintenance Management, as presented in this manual, represents the results of these development efforts. A Servicewide Technical Committee was established by the National Park Service to monitor, review and provide technical guidance to recognize diverse needs of the various park areas.

MAINTENANCE MANAGEMENT OVERVIEW

Maintenance Management provides a formalized process and procedures for managing maintenance operations in all park areas. Although the magnitude of the maintenance workload varies from area to area, the same procedures are adaptable to park areas of all sizes and with differing responsibilities. The four major functions of Maintenance Management are:

- Planning
- Organizing
- Directing
- Controlling

All components of Maintenance Management were developed to reflect maintenance requirements and conditions in all park areas throughout the nation. Maintenance Management provides managers and supervisors with effective procedures to manage and control their maintenance responsibilities. Microcomputers are used to store relevant maintenance data, perform calculations and prepare reports. By eliminating the need for tedious, time-consuming manual tasks, the maintenance staff is available to perform other maintenance work.

The planning, organizing, directing and controlling functions are shown in the Maintenance Management flowchart in Figure 1. Each function has several components which are integral to Maintenance Management.

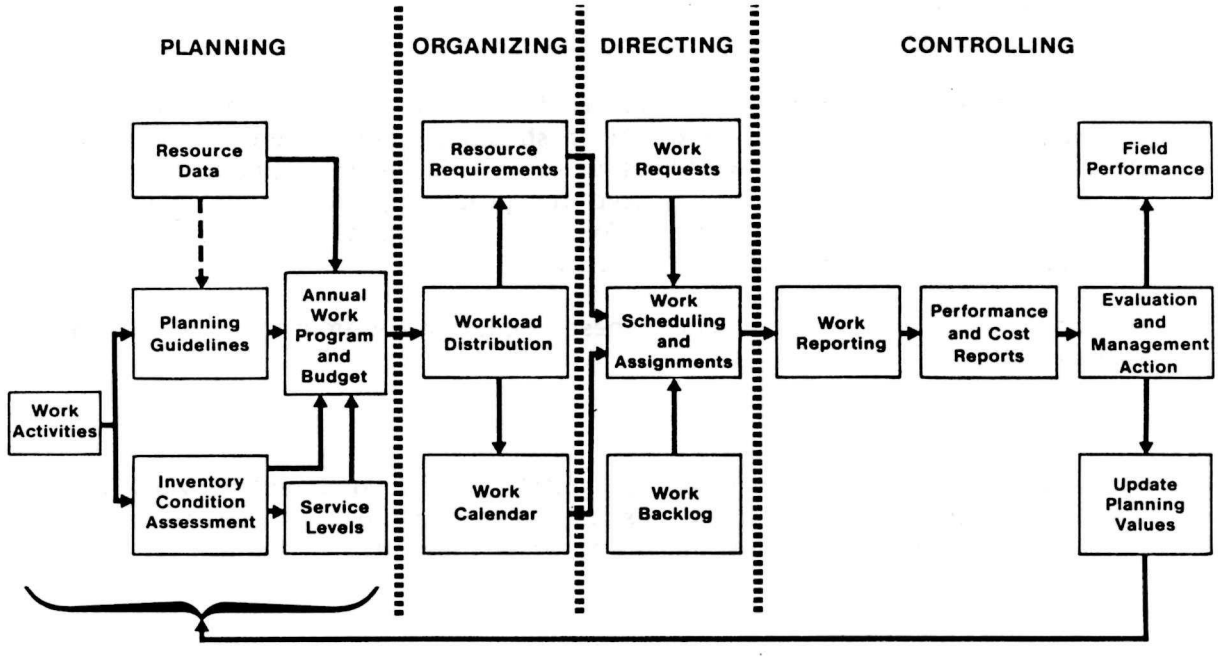
Planning

The planning function provides a Work Program and Budget that reflects management decisions and objectives for park maintenance activities. This process includes the development of several planning elements that are organized and compiled to form a work program and budget. These elements are:

- Organization Data
- Work Activities
- Inventory and Condition Assessment
- Service Levels
- Planning Guidelines
- Resources and Unit Costs

Section 1 of this manual describes these elements, how they are developed and how they are used to develop a work program and budget.

FIGURE 1
BASIC MAINTENANCE MANAGEMENT INFORMATION FLOW



Organizing

As shown in the flowchart, the organizing elements are:

- Workload Distribution
- Work Calendar
- Resource Requirements

Workload distribution procedures are used to allocate the total annual work program to the months the work will or should be performed. The need for staffing to match seasonal workload variations is readily apparent from this process. A work calendar to be used for preparing short-term schedules is provided. The monthly requirements for labor, equipment and materials needed to do the annual work program are identified.

Section 2 of this manual describes these organizing elements of Maintenance Management.

Directing

The work directing function involves identifying and documenting work needs, preparing short-term work schedules and assigning work to the maintenance staff. These elements are shown in the flowchart and involve the use of:

- Work Calendar Status Reports
- Work Requests and Backlog Reports
- Knowledge of other factors affecting maintenance activities.

These work directing procedures assist the managers and supervisors in their efforts to accomplish the work program objectives in an efficient and cost-effective manner. The use of work directing procedures is described in Section 3.

Controlling

The work controlling function consists of monitoring the progress of work performed in comparison to the plan and taking action to direct or redirect future efforts. Procedures are provided for collecting, evaluating and using work performance data reported by field maintenance personnel.

Work performance and cost reports are available for managers and supervisors to use in analyzing and evaluating maintenance work efforts in their respective park areas. The MM reports that are available are described in Section 4.

PARK PROGRAM MANAGEMENT AND MAINTENANCE MANAGEMENT

Park Program Management (PPM) is now being used in various ways and varying degrees throughout the Service to organize maintenance operations. The PPM process utilizes a series of forms for documenting work programs and accounting for funds. Specific forms used include the Job Order Request (10-577), Operating Program (10-576), and Financial Plan for the Current Operating Program (10-575). These are the principal forms used for managing the park's maintenance program. Several other forms, including the Annual Operating Program (10-450) and Project Management Plan (10-451) have also been used or are presently being used. Generally, the 10-577's are used to support completion of the 10-576's, which in turn are used to prepare the 10-575's, the primary forms used to track maintenance programs.

Maintenance Management provides detailed documentation of the maintenance workload and helps identify when specific activities should be performed. MM allows the work program to be easily modified when funding availability or other conditions change. MM provides guidance in scheduling work and provides more timely and useful information to maintenance managers. Perhaps some of the most significant differences between PPM and MM are: using Maintenance Management, work is planned for the total park maintenance requirements instead of just those work activities that are within the available funding targets; management attention and management action are focused on work activities instead of on facilities; and the procedures used in controlling and evaluating work programs are directed towards work accountability. PPM focuses primarily on costs and use of funds whereas MM focuses primarily on work planning and accomplishment as well as the costs associated with specific maintenance activities. With MM, maintenance managers have more detailed information and documentation of work programs and can use such documentation to develop the park's current operating program.

Maintenance Management is designed to assist maintenance managers in their efforts to plan, organize, direct and control the park maintenance program. It is a tool for managers to use in setting objectives, preparing programs, and carrying out those programs. Maintenance Management is a work management system with associated cost data. It is not a cost accounting system.

MAINTENANCE MANAGEMENT DOCUMENTATION

There is a series of reference manuals and materials provided and available for instruction and guidance in the use and application of Maintenance Management.

Operations Manual

The Operations Manual is written for those individuals with responsibility for the development, implementation and operation of Maintenance Management. The manual outlines the procedures for developing, using, and updating the MM procedures and data and is divided into two parts. Part 1 provides the narrative and the Servicewide reference materials. Part 2 is designed to function as the appendices with space for organizing and storing park-specific data and reports.

Desk Reference Manual

The Desk Reference Manual provides a summary overview of MM procedures and applications. It is intended for top management as a general reference document. Space is provided for reference materials and current MM reports.

MAINTENANCE MANAGEMENT SUPPORTING MATERIALS

There are several other elements available to support park maintenance managers in their efforts to install and use Maintenance Management.

Servicewide Information

In order to provide some uniformity throughout the Service's Maintenance Management, several key planning elements have been developed for use at the park level. Activity codes, names and units of measure have been developed with some flexibility for modification or addition at the park. Model planning guidelines have been prepared to guide park managers in developing park-specific planning guidelines. Inventory features and units have been designated for the work activities. Model lists of labor, equipment and materials identification data were prepared.

Computer-assisted Data Processing

Maintenance Management involves a significant amount of data and numerous calculations, summaries and reports that would be extremely time consuming if performed manually. The National Park Service's Maintenance Management is computer-assisted to minimize the amount of time required to prepare the information. This allows the managers and supervisors to concentrate on field inspections of park facilities and management of maintenance operations.

The Maintenance Management computer programs use the organization, feature, resource and work activity information to:

- Develop a work program and budget
- Distribute the workload throughout the year
- Accumulate and process data about work accomplished and costs
- Produce evaluation reports comparing work planned to work accomplished.

This computer support for Maintenance Management provides the capability for maximum use of available maintenance data without excessive manual calculations and tabulations.

The Computer User Manual contains detailed instructions and reference material for using the computerized components of Maintenance Management. Users are guided in the use of the various programs available through menus, or lists of options that can be selected. There are also HELP screens available throughout the programs that display additional information or guidance.

Training Materials

A separate set of training materials is available to supplement the MM documentation, Servicewide information, and computer software. These materials will be available for ongoing use as needed for continued guidance in the concepts, operations, and application of Maintenance Management.

The training materials that will be available for use or reproduction will include:

- A copy of the material presented at the Regional training sessions, with instructor's guide and teaching instructions.

- A set of all training aids to support Maintenance Management instructions:

  - Computer graphics
  - Overhead transparencies
  - Maintenance Management overview videotape
  - Condition assessment videotape and practice exercise
  - Wall charts.

- A complete set of the implementation workshop materials.

SERVICEWIDE APPLICABILITY OF MAINTENANCE MANAGEMENT

The MM concepts of planning, organizing, directing, and controlling are applicable to all park areas. However, the types and volume of data required as well as how those data may be presented may vary somewhat depending on the size and scope of the park's maintenance operation. In some cases, manual data processing may be just as effective to prepare the necessary information. When fewer data and smaller numbers are used, some of the data and reports may be adversely affected by rounding or the lack of significant decimals.

The decision was made to provide computer data processing to all park areas, either through having a computer on-site or having Regional computer support available. This enables a consistent approach to Maintenance Management throughout the Service, regardless of the park area size or work responsibilities.

To accommodate this approach and to address the potential data problems, the MM computer program has the capability to provide a greater level of detail in those instances where fewer data and smaller numbers may be used.

This capability is provided through a separate process (built-in to the programs) that adds decimals to some of the key information items in the screens and reports. The park maintenance manager can decide whether this capability is appropriate for his or her information needs. However, if the decision is made to use this function, it cannot be changed for the duration of the work program year.

All of the reports and functions of the MM computer process will be available to all park areas. However, it is unlikely that all park managers will want or need to use all of the reports in the same manner. Each park manager should become familiar with the MM information and determine which reports will best fit with his or her particular information requirements.

Section 1

WORK PLANNING PROCEDURES

The Maintenance Management work planning process is used to prepare programs that represent management decisions and objectives relative to park maintenance. This process involves the development of several key planning elements:

- Significant work activities are defined;
- An inventory of park physical features is compiled and the condition of selected features is evaluated;
- Decisions are made regarding the amounts of work required and possible to meet the program objectives.
- Estimates of the labor, equipment, and materials required and productivity expected for each activity are developed;
- Average rates and unit prices are compiled for the defined labor, equipment and materials.

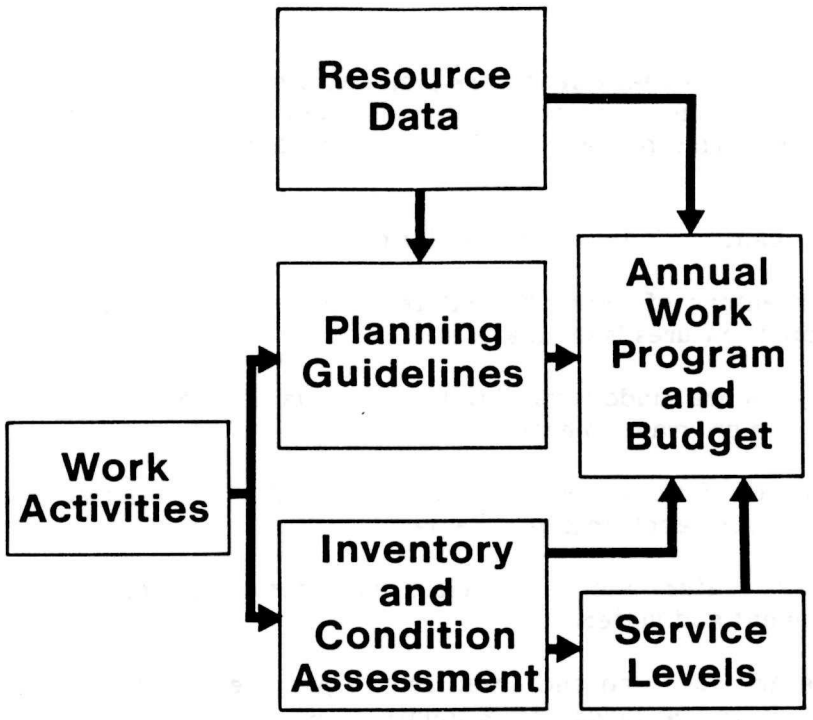
These data are compiled and organized to prepare a work program and budget that summarizes the kinds and amounts of work desired as well as planned to meet specific maintenance service level objectives.

A Deferred Maintenance Report is also available that documents both the desired and planned work programs as well as the difference between the two. This difference, known as deferred maintenance, represents the volume of work not included in the planned work program.

The work program and budget developed in this planning process serves as the basis for the Maintenance Management organizing, directing and controlling procedures.

The planning process is illustrated in the flowchart presented in Figure 1-1.

FIGURE 1-1
WORK PLANNING PROCEDURES FLOWCHART



WORK ACTIVITIES

The Maintenance Management planning process is based on the development of work activities. Each defined activity describes a specific type of work and provides a practical way to estimate labor, equipment and material needs and productivity. Example activities include Patch Potholes, Pickup Litter, or Grounds Mowing.

The development of the park work activities should recognize the fact that some activities are more important or more significant than others in terms of labor effort, budget required, or information needs. The most important activities are identified separately. The others can be grouped together in "general" activities. In this way, park managers are able to direct their attention to the more important items without an overly-complex activity list.

Each activity includes (1) a numeric code for computer processing; (2) a title for easy reference; (3) a description to clearly identify the work included; (4) a work unit used to measure the amount of work planned and accomplished; and (5) an inventory unit to relate the work to the park's physical inventory features.

A list of work activities was prepared to provide uniformity of activity development throughout the Service. This list of Servicewide activities is used as the basis for developing the park-specific work activities. Those activities in the Servicewide list that satisfy park needs are selected. There is provision in the numbering system to allow for more detailed or individualized activities to suit park practices and information needs.

The definition of work activities is flexible. As park workloads, priorities, and information needs change, the activity list can and should be revised.

INVENTORY AND CONDITION ASSESSMENT

The number and type of park features (physical assets) and the condition of these features are major factors in determining the kinds and amounts of work needed in each park area.

Maintenance Management inventory data needs are defined as a result of the work activity list development. After the activities have been developed, the inventory units associated with each of the designated activities make up the list of maintenance feature inventory data required. These inventory data provide the basis for preparing the maintenance work program.

The maintenance feature inventory is prepared by compiling data from all available sources and organizing these data into a format for use in the Maintenance Management program. These procedures are detailed in the Operations Manual.

The condition of park features helps to determine where and how much work is needed to maintain the features at a level consistent with park policies and priorities. Because planned maintenance often depends on the condition of a particular feature, an annual condition assessment is necessary. This assessment of the park conditions can be very helpful in preparing a specific maintenance work program that reflects actual park conditions. The condition assessment also allows park management and field supervisors to schedule work more specifically as needed.

All inventory features are not rated. Only those features where an assessment is realistic and practical or where rating data provide useful information, are evaluated. For example, mowable areas and snow removal areas are two of several inventory features where a condition rating is not practical. For the designated features, the assessment consists of a comparison of the current observed condition with an established condition guideline. The rating is then an evaluation of how closely the current condition matches the guideline. The condition assessment process should be performed annually prior to the development of the Maintenance Management work program; in this manner, the most recent conditions and changes thereto can be reflected in the Maintenance Management planning process. Procedures and forms for conducting the condition assessments are contained in the Operations Manual.

SERVICE LEVELS

The development of service levels is a management decision-making process and is essential to prepare work programs which best reflect park needs, priorities, available resources and other park programs.

The service level as used in Maintenance Management is the annual level of intensity or frequency an activity is applied to an asset (inventory unit). For each activity, the service level is expressed as the number of work units per inventory unit per year. For example, the service level for patching potholes is expressed in terms of tons of premix per paved surface mile. For painting interior surfaces, the service level would be expressed in terms of square feet painted per square foot of paintable interior surface. For campground maintenance, it would be stated in terms of person hours per campground. It is important to realize that the service level represents an annual average effort. In the pothole patching example, many miles may not require any patching while specific locations or sections may require considerable effort.

Two service levels, the desired service level and the planned service level, are to be established for each activity.

The desired service level is an estimate of the amount of work required to keep an asset functioning and in acceptable condition or bring it up to a desired condition in a selected time period. It is assumed that there are no limitations on funds or other resources when estimating this level of effort. However, practical considerations would preclude establishing this level higher than the point where costs become greater than benefits derived from the effort.

The planned service level is an estimate of the work effort to be accomplished, recognizing budget limitations, availability of labor, equipment or materials, or other constraints prohibiting completion of the desired service level. This planned service level reflects management decisions to balance park priorities, needs and objectives with limited funds, personnel and equipment.

The two service level estimates are used to calculate separate work programs and budgets. The two work programs and budgets can then be compared to determine the amount of work and cost of that work that had to be deferred. The planned service level and the resulting work program is the one that is ultimately used in all subsequent Maintenance Management processes.

The service level is one of several factors used to calculate a work program and budget. To explain this process, the following paragraphs illustrate the arithmetic involved in the work program and budget development. First, the annual work quantity for each activity is calculated by multiplying the service level by the inventory quantity as follows for an activity (Stabilize Unpaved Surfaces).

Desired Service Level	x	Inventory	=	Annual Work Quantity
37.5 Tons of Material per Unpaved Surface Mile	x	200 Unpaved Surface Miles	=	7500 Tons of Material

Next, the annual number of crew days required to do the work can be calculated by dividing the annual work quantity by the average daily production (from the planning guideline for the activity).

Annual Work Quantity	÷	Average Daily Production	=	Annual Crew Days
7500 Tons of Material	÷	150 Tons per Crew Day	=	50 Crew Days

With the quantity of labor, equipment and material known (also from the planning guideline), along with their respective unit costs, the total annual budget for this activity can be calculated.

Cost Item	Cost Per Crew Day	Total Annual Cost (50 Crew Days)
Labor	$ 320	$16,000
Equipment	180	9,000
Material	600	30,000
Total	$1,100	$55,000

If adjustments are to be made to the annual work program and budget, it is usually the service level values of the various activities which must be revised. The inventory quantity is relatively fixed and the crew makeup and average productivity are not usually changed once the best, most efficient work method has been established.

In the example, the desired service level is 37.5 tons of material per unpaved surface mile with an estimated cost of $55,000. If budget constraints limit the funds available for this activity to $50,000, the planned work quantity would be recalculated to be 6,810 tons of material at a service level of 34.1 tons per mile.

	Desired	Planned	Deferred Maintenance
Service Level (tons/mile)	37.5	34.1	3.4
Annual Work Quantity (tons)	7,500	6,810	690
Crew Days	50	45.4	4.6
Annual Cost	$55,000	$50,000	$5,000

This example illustrates the concept of the two service levels and the relationship between the service levels and inventory quantities. The work program and budget concept introduced here is discussed in more detail later in this section. Obviously, many calculations are required in this process. The MM computer program performs these calculations to aid the decision making process.

In developing the activity service level values, the maintenance managers must keep in mind some general criteria that relate to NPS's role and mission in preserving national, historical, cultural and recreational resources. These criteria provide the foundation or basic reason for performing many, if not all, of the work activities.

- Preservation of Assets and Resources
- Safety, Health and Handicapped Accessibility
- Aesthetics
- Convenience
- Management Initiatives

The development of the numerical values used in the service level requires research and estimating using one or more sources of information or methods. The following list of possible sources of information or methods to establish service levels is not meant to be all-inclusive. There may be other ways of estimating and setting service levels that can be used as well.

- Preventive Maintenance Program.
- Inspection/Surveys.
- Historic Preservation Information.
- Policy/Standards
- Records Research
- Professional Judgment/Field Experience
- Mandatory Requirement
- Design Standard
- Future Plans
- Frequency/Cyclical

Using one or more of the preceding sources of information, the maintenance staff prepares service levels for all activities. This effort requires a combination of estimates, assumptions, logical conclusions, and some calculations. This development process is documented on a work sheet for each activity for use in future reviews and adjustments of the work program.

PLANNING GUIDELINES

One of the basic objectives of Maintenance Management is to ensure effective and economical use of labor, equipment and materials in the performance of park maintenance activities. This is accomplished, in part, by developing guidelines for planning and organizing work based on the work methods and resources required to perform the work activities in the most effective and economical manner.

The planning guidelines support the work program and budget development by providing the framework for estimating the labor, equipment, materials, and the expected daily productivity for each activity. The guidelines also provide information about:

- what work is to be done;
- when the work is to be done;
- why the work is to be done; and
- how well the work is to be done.

These data, for each activity, support managers and supervisors in their efforts to maximize the use of available labor, equipment and materials in accomplishing park work programs.

Planning guidelines are developed for each park work activity. They are based on Servicewide guidelines that have been modified and adapted to reflect specific park needs and practices. The Planning Guideline (Form 10-213) is presented in Figure 1-2.

Some park maintenance managers may want more detail for some activities. The Work Procedure (Form 10-213A) can be used to document these additional details.

These planning guidelines and any related work procedures are extremely important elements of Maintenance Management.

The estimated resources and productivities are significant factors in the work program and budget development. The average daily production is used to estimate the number of crew days it will take to accomplish the annual work quantity. The crew size is used to calculate the estimated person days required for the year. The labor, equipment and materials required for each activity are summarized for all activities to estimate the total needs for personnel, equipment, and materials by classification. Hourly rate and unit costs are applied to these quantities to develop the budget.

The planning guidelines also provide information to use in scheduling and assigning work. The average daily production can be used in estimating the time to allow for each specific job identified. The labor and equipment section of the guideline can be used to estimate the number and types of personnel and equipment required for each specific job to be scheduled. When the work is

FIGURE 1-2
PLANNING GUIDELINE

FORM 10-213
(JANUARY 1987)

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U.S. Department of the Interior
National Park Service
Maintenance Management

PLANNING GUIDELINE
SERVICEWIDE

WORK ACTIVITY	GROUNDS MOWING	CODE	3110

DESCRIPTION

The mowing of turf and grassy areas with riding mowers. Includes all areas that are maintained as landscaped areas within the park.

PLANNING CRITERIA	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
	X						X	X	X	X	X	X

Schedule this activity in accordance with park mowing policy or schedule.

CREW SIZE	QUANTITY
Maintenance Worker	2

EQUIPMENT	QUANTITY
Pickup	1
Equipment Trailer	1
Riding Mower	2

WORK CONSIDERATIONS

1. Inspect cutting blades and equipment. Use daily PM checklist.
2. Set mowers for height of cut according to park mowing policy.
3. Always mow along curb or sidewalk so that discharged cuttings are thrown onto turf and not paved surfaces.

MATERIALS

REFERENCE AND SAFETY

AVERAGE DAILY PRODUCTION		INVENTORY	
QUANTITY	WORK UNIT	FEATURE	UNIT
15-20	Acres	Mowable Grounds	Acres

PLANNING GUIDELINE APPROVAL

BY		EFFECTIVE	4-15-87	SUPERSEDES	

assigned, the planning guideline and any additional work procedure details may be used to supplement information and instructions given to the crew.

The planning guideline provides an immediate method to measure and evaluate work accomplishment. The work considerations and work methods can outline expected work quality. The actual accomplishment when compared with the estimated average daily production provides some measure of evaluating the efforts. The guideline also provides a basis for evaluating potential improvements in work methods, new equipment, or use of different combinations of people and equipment.

Finally, the planning guidelines can be used effectively to supplement training efforts for new and temporary personnel.

For these reasons, it is especially important that maintenance managers and field supervisors take time to develop good planning guidelines and then use them in their operations.

RESOURCES AND UNIT COSTS

The planning guidelines outline the estimated labor, equipment and materials required to accomplish each work activity. Estimated average hourly rates and unit costs are established for the defined resources. The activity-by-activity resource needs and costs are calculated and summarized for three distinct purposes: (1) the work program and budget; (2) resource requirements summaries; and (3) evaluation report cost data.

Work Program and Budget. The quantities of all the labor, equipment and materials needs are calculated. The hourly rate or unit cost for each required resource is applied to the quantity required. These total costs are then calculated and summarized to provide a total cost of labor, equipment and materials needed to accomplish the work program objectives.

Resource Requirements. The detailed activity resource needs are calculated and summarized to provide estimated quantities of the labor, equipment and materials needed to perform the planned work. These quantities are further defined by month to aid the scheduling and procurement processes.

Evaluation Report Cost Data. As work is accomplished, the field personnel record the kinds and amounts of labor, equipment and materials used in doing the work. The quantities of the resources used are summarized for analysis with original planning estimates. The average hourly rates and unit costs are applied to these quantities to provide cost data for the work activities completed.

OTHER PLANNING ELEMENTS

To complete the Maintenance Management planning process, there are several other elements to be defined.

Management Units. The work activities and inventory data need to be assigned to the respective work groups within the park maintenance organization. With this organization assignment, it is possible to develop work programs for each of the various groups. Typically, these management unit decisions will be consistent with the existing park organization. However, as a result of the Maintenance Management planning and analysis processes, better ways to organize the workload may be defined.

Activity Deviation Level. For each activity, an acceptable deviation percentage is defined. This percentage is used in the preparation of the evaluation reports. In the reports, a percent of planned performance is calculated using the actual data reported. When this percent is outside the range of acceptable performance as established for each activity, it is noted on the report. This routine provides managers and supervisors with the capability to apply exception reporting concepts to their review of the evaluation report.

Planned Overtime. For some activities it may be necessary to recognize and plan for overtime work that is likely to occur. Snow and ice control work, for example, may require considerable effort during off-hours, requiring substantial overtime cost. These activities will be planned and treated separately to recognize the increased costs and potential impact on staffing and equipment needs.

Location File. The Maintenance Management computer system provides the capability to record and summarize work efforts done at specific locations. To do this, a location file with the identification data for all park work locations is established. Typically this file may consist of buildings, road sections, campgrounds, or utility systems.

WORK PROGRAM AND BUDGET

The annual work program specifies how much work is planned during the year for each work activity and is expressed in terms of total work quantities and required person days of effort. The feature inventory, service levels and planning guidelines control the magnitude of the annual work program for each management unit. The work program is calculated separately for each unit and summed to obtain the total park maintenance work program. The annual maintenance budget is based on the work program by activity for each management unit and the unit costs for labor, equipment and materials.

The work program is determined by multiplying the desired service level by the appropriate unit of inventory--thus identifying the number of annual work units for each activity. The work units are then divided by the average daily production as specified in the planning guideline to obtain the total number of crew days planned. The number of crew days is then multiplied by the crew size (number of persons per crew day) to determine the number of person days required.

The following computations are performed for each activity and for each management unit:

Inventory Units	X	Level of Service	=	Annual Work Quantity
Annual Work Quantity	÷	Average Daily Production	=	Crew Days Required
Crew Days Required	X	Crew Size	=	Person Days

When all of the activities have been treated in this manner, the annual work program will have been defined in terms of total work quantities, number of crew days and total person days.

The hourly rates and unit costs for the specified labor, equipment and materials are applied to the estimated quantities to develop a cost for one crew day of work. This cost is applied to the annual crew days to calculate the annual budget for labor, equipment and materials.

Initial calculations of the work program and budget are made with the desired service levels. Subsequent changes are made and reflected in the planned service levels. The work program and budget values may be reviewed and revised on the computer screen prior to printing any reports. Total costs, work quantity or service level may be modified for any work activity in order to meet budgetary limits or available resources. The changes are calculated and the results displayed immediately on the computer screen. With this capability, it is fairly easy to modify the work program and budget to reflect management decisions and objectives.

Work Program and Budget Report

The Work Program and Budget Report provides a listing of the activity information in more detail than available on the computer screen. This report documents the planned work program and budget data for all activities. There are several variations for detailed and summary versions of the report. A typical report is displayed in Figure 1-3.

This report is usually prepared in conjunction with the budget development, review, adjustment, and approval processes. It may be prepared as frequently as necessary to reflect changes in decisions and priorities. Mid-year budget adjustments may also require new reports to document the program changes.

FIGURE 1-3
WORK PROGRAM AND BUDGET REPORT

NATIONAL PARK SERVICE — WORK PROGRAM AND BUDGET — PAGE: 01
MAINTENANCE MANAGEMENT — DATE: 10/01/86
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

ACTIVITY CODE	NAME	FEATURE INVENTORY QUANTITY	UNIT	PLANNED SERVICE LEVEL	PCT OF DES	ANNUAL WORK QUANTITY	AVG DAILY PROD	CR SZ	PERSON DAYS	COST DISTRIBUTION LABOR	EQUIP	MAT/OTH	TOTAL COST
4160	PAINT EXT SURFACE	222400.0	SQ FT	0.30 SQ FT	75	66720	700.0	2	190	22875	9108	7287	39270
4310	MAIN/REP ROOF COV	1100.0	SQUARE	0.10 SQUARE	50	110	4.0	4	112	13440	3342	6685	23467
4790	GEN BLDG UTIL MTCE	102.0	BLDG	7.06 PERS HR	88	720	8.0	1	90	9360	1350	450	11160
4990	GEN BLDG MTCE	102.0	BLDG	11.76 PERS HR	74	1200	8.0	1	150	15600	1500	1500	18600
9120	SUPERVISION	1.0	YEAR	1800.00 PERS HR	100	1800	8.0	1	225	27000	9000	0	36000
						TOTALS:			767	88275	24300	15922	128497
										OVERHEAD 12% OF LABOR			10593
											TOTAL BUDGET		139090

Deferred Maintenance Report

The Deferred Maintenance Report is a comparison of the work program derived from the desired and planned service levels. For each of the two programs the annual work quantities and total costs are displayed. The difference between these programs is calculated and displayed as Deferred Maintenance. With these data, park managers can readily identify the volume of work that is not included in the planned work program. As with the Work Program and Budget Report, this report will likely be prepared in conjunction with the park budget development and approval processes.

There are several variations in detail and summary versions of this report, including an abbreviated version that can be viewed on the computer screen. A typical report is shown in Figure 1-4.

FIGURE 1-4
DEFERRED MAINTENANCE REPORT

NATIONAL PARK SERVICE — DEFERRED MAINTENANCE — PAGE: 1
MAINTENANCE MANAGEMENT — DATE: 10/01/86
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

ACTIVITY CODE	ACTIVITY NAME	FEATURE INVENTORY QUANTITY	FEATURE INVENTORY UNIT	DESIRED PROGRAM ANNUAL WORK QTY	DESIRED PROGRAM UNIT	DESIRED PROGRAM COST	PLANNED PROGRAM ANNUAL WORK QTY	PLANNED PROGRAM UNIT	PLANNED PROGRAM COST	PLANNED PROGRAM PCT	DEFERRED MAINTENANCE ANNUAL WORK QTY	DEFERRED MAINTENANCE UNIT	DEFERRED MAINTENANCE COST	DEFERRED MAINTENANCE PCT
4160	PAINT EXT SURFACE	222400.0	SQ FT	88960	SQ FT	52360	66720	SQ FT	39270	75	22240	SQ FT	13090	25
4310	MAIN/REP ROOF COV	1100.0	SQUARE	220	SQUARE	46934	110	SQUARE	23467	50	110	SQUARE	23467	50
4790	GEN BLDG UTIL MTCE	102.0	BLDG	816	PERS HR	12648	720	PERS HR	11160	88	96	PER HRS	1488	12
4990	GEN BLDG MTCE	102.0	BLDG	1632	PERS HR	25296	1200	PERS HR	18600	74	432	PERS HR	6696	26
9120	SUPERVISION	1.0	YEAR	1800	PERS HR	36000	1800	PERS HR	36000	100	0	PERS HR	0	0
				TOTALS:		173238			128497	73			44741	27

Section 2
Work Organizing Procedures

Section 2

WORK ORGANIZING PROCEDURES

The work program and budget and related planning elements represent the annual work program decisions and objectives. The MM work organizing procedures are used to (1) allocate this annual plan to monthly programs, (2) prepare a work calendar, and (3) define the labor, equipment and materials required to accomplish the annual and monthly plans.

The workload distribution process is used to develop monthly allocations of work for each activity based on factors such as seasonal constraints, park priorities, visitor use, and specific activity schedule requirements. This process also provides information for managers and supervisors to use in developing strategies for permanent, seasonal, volunteers, and contractor staffing needs.

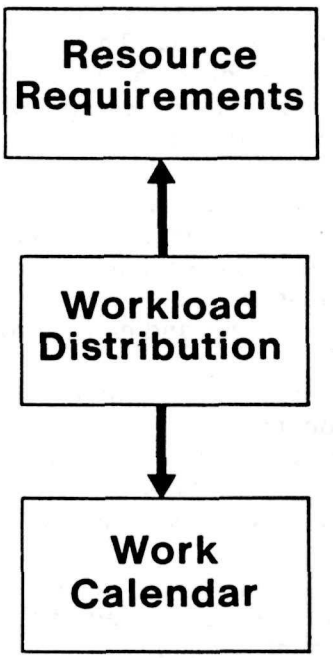
After distributing the workload to recognize the many outside factors, a work calendar is prepared to document and communicate the maintenance division work plans. The work calendar serves as an aid to the work scheduling process as well as the basis for estimating the labor, equipment and materials requirements and monitoring progress toward work program objectives.

The kinds and quantities of labor, equipment and materials needed to accomplish the work program objectives are calculated and summarized in reports that can be used for making management decisions.

This organizing process is illustrated in the flowchart in Figure 2-1.

FIGURE 2-1
WORK ORGANIZING PROCEDURES FLOWCHART

Organizing



WORKLOAD DISTRIBUTION

The annual work program identifies the total planned work quantities and person days for each maintenance work activity and the total person days for all work activities in each management unit for the year. The annual work program is distributed to each month so that managers can schedule work and define the labor, equipment and materials needed to accomplish the work program.

All maintenance work is not equal in terms of when it should, or can, be performed. Grass must be mowed during the growing season; snow plowed when it snows; and campgrounds maintained during the months of use. Weather conditions, holidays, variable visitor volumes and special park events all affect the performance of maintenance work. The objective of the workload distribution process is to distribute the work as uniformly as possible during the months when the work should, or can, be performed.

In most parks it will not be possible to completely eliminate the fluctuations in the workload to achieve a "level" distribution across all 12 months. In these cases, the staffing levels should be adjusted to match the variable workloads. This adjustment can be achieved through the use of part-time employees, seasonal workers, private contractors or overtime work.

Workload distribution is a computer-assisted process to review and adjust the person days for each activity as necessary to achieve a logical distribution of the planned work and a reasonable staffing requirement. There are many different factors to consider when adjusting the distribution of work. Factors such as the following need to be addressed to ensure a realistic distribution.

- Weather and seasonal constraints
- Special park events
- Equipment availability and shared needs of outside help availability such as seasonal and volunteer help
- Permanent staff availability -- minimums and maximums
- Interaction and coordination between management units for work activities
- Number of park visitors
- Coordination with other park organizations
- Coordination and timing requirements between activities

The Workload Distribution Report documents the decisions and results of the work distribution process. It displays the monthly person days required for all activities as well as the average number of persons required each month. The

report can serve as a work sheet for review and further refinement of the workload distribution. Perhaps, more importantly, it will be helpful to coordinate and substantiate staffing decisions and the alternative actions such as requesting seasonal employees, recruiting volunteers, deciding to use outside contractors, or working the existing staff for extended hours. Essentially, the report provides a picture of the kinds of work planned for each month, the estimated labor effort required to do the work and the total staff required to do the total work program. Park maintenance managers then work with these data to put together the most effective and efficient mix of labor, equipment and materials to accomplish the program.

WORK CALENDAR

The workload distribution process produces monthly work programs in terms of the kinds and amounts of work. These monthly programs make up a work calendar and become the basis for estimating labor, equipment and materials needs, scheduling work and evaluating progress toward work program objectives.

The Work Calendar Report summarizes these monthly program data for use by managers and supervisors. This report presents the planned work program for each month in terms of estimated crew days to be used. The annual work quantity, crew size and the average daily production are also displayed for each activity.

This report is to be prepared at the beginning of the year to display and communicate the work program objectives to park managers and supervisors. It is then prepared periodically during the year with the actual data included for comparison with the planned work calendar.

An example of the Work Calendar Report is presented in Figure 2-2.

FIGURE 2-2
WORK CALENDAR

NATIONAL PARK SERVICE — WORK CALENDAR — PAGE: 1
MAINTENANCE MANAGEMENT — DATE: 10/01/86
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

ACTIVITY CODE	NAME/ANNUAL WRK QTY	CR SZ	CREW DAYS - PLANNED OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANNUAL TOTAL	AVG DAILY PRODUCTION
4160	PAINT EXT SURFACE 66720 SQ FT	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	20.0	20.0	15.0	95.0	700.0
4310	MAIN/REP ROOF COV 110 SQUARE	4	2.0	2.0	2.0	2.0	2.0	2.0	4.0	4.0	4.0	4.0	0.0	0.0	28.0	4.0
4790	GEN BLDG UTIL MTCE 720 PERS HR	1	6.0	6.0	6.0	6.0	6.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	90.0	8.0
4990	GEN BLDG MTCE 1200 PERS HR	1	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	10.0	10.0	10.0	150.0	8.0
9120	SUPERVISION 1800 PERS HR	1	18.0	18.0	18.0	18.0	18.0	18.0	18.0	19.0	20.0	20.0	20.0	20.0	225.0	8.0

RESOURCE REQUIREMENTS

Several reports are available to summarize the requirements for labor, equipment and materials. These data are calculated activity-by-activity, based on the planning guidelines and related estimates for a crew day of work on each activity. The annual crew days and monthly distributions of these days are then used to calculate the annual and monthly requirements for each type of resource specified. These activity requirements are then compiled by each class of resource--equipment operator, carpenter, laborer, etc. These class-by-class data are presented in summary form.

These details and summaries provide information necessary for analysis and decisions regarding staffing, equipment needs and materials procurement.

Staffing

The labor requirements reports summarize the total number of personnel by classification required by a specific management unit. Having these reports can be very helpful in determining the needs for temporary personnel, contract assistance, or overtime work to accomplish peak or seasonal workloads.

The reports should be used in conjunction with the workload distribution process when analyzing the makeup of the work force in each management unit. The workload distribution provides information in generic person days only, while these reports provide details by labor classification.

Equipment

The equipment requirements reports identify equipment needs by major classification by month for each management unit. Comparing these needs with equipment availabilities provides necessary information for equipment purchase, lease, or rental decisions.

The detail equipment reports identify by type of equipment the work activities that require the equipment and the estimated days of use by month. The detail report is helpful in identifying specialized types of equipment that may be shared by more than one management unit when the annual use by any one management unit does not justify exclusive assignment. For some work activities it also may be feasible to substitute one type of equipment for another. For example, different types of trucks may be used if the function is primarily transportation to/from the job sites.

Materials

The materials requirements reports identify the major types of materials and required quantities by months throughout the year. These reports can be used for ordering and procurement to ensure that sufficient materials are available when required.

Section 3
Work Directing Procedures

Section 3

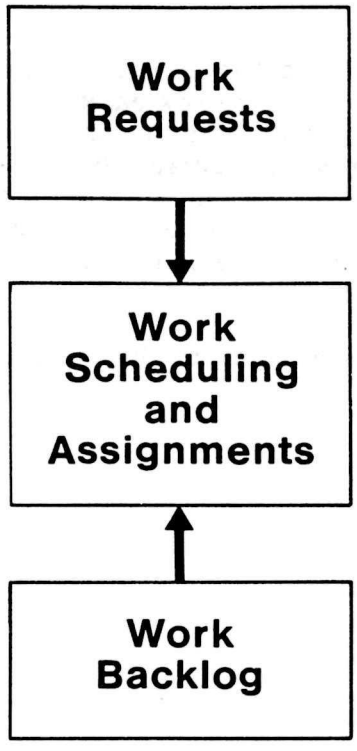
WORK DIRECTING PROCEDURES

The work program defines the estimated quantities of each work activity in each management unit for the year. The work calendar, as developed in the workload distribution process, outlines the estimated monthly distribution of the efforts required to accomplish the work program objectives. The MM work directing procedures include guidelines for identifying and documenting work needs, preparing short-term work schedules and assigning work to the maintenance staff. These procedures help managers and supervisors in their efforts to attain the work program objectives.

These directing procedures are illustrated in the flowchart in Figure 3-1.

FIGURE 3-1
WORK DIRECTING PROCEDURES FLOWCHART

Directing



IDENTIFYING WORK NEEDS

The annual work program identifies the estimated work efforts required to satisfy planned service level objectives. The work calendar provides a guide for the monthly timing of the work activities. Specific work needs are identified through field inspections, work requests and other park programs.

Field Inspections

Frequent field inspections identify specific locations where work is required and keep supervisory personnel aware of current conditions in the park. Inspections are also required when work requests or needs are reported from outside the maintenance division. These requests from outside the division should be checked or reviewed to verify the information as well as to estimate the amount of work and effort required.

Also, the supervisor should be regularly inspecting the work in process and completed to evaluate work methods and work quality and to verify the original estimates of effort required for the work.

Work Requests

As an aid to document the identified or requested work needs, a Work Request (Form 10-214) is provided as part of MM. The form is intended primarily for use by the maintenance personnel but other park staff may find it useful as well. Any other established work request system may also be used to supplement this process.

Generally, there are two main sources of information or requests for work:

- work needs identified by maintenance supervisors and employees as a result of their activities, and
- work requested by other park staff and park visitors.

The Work Request form is shown in Figure 3-2. The identification data on the top portion of the form are completed when the request is received. The rest of the form is completed after the request is reviewed and the specific work needs confirmed.

The completed forms provide helpful information in the work scheduling and assignment processes. These data--activities, priorities, estimated efforts, and specific locations--all serve as key input to scheduling work activities. When the work is assigned, work requests can be used to supplement the communication process to provide additional details about the work to be done.

FIGURE 3-2
WORK REQUEST

FORM 10-214
(January 1987)

U.S. Department of the Interior
National Park Service
Maintenance Management
WORK REQUEST

REPORTED BY
☐ Visitor
☐ Maint.
☐ Other Div.

IDENTIFICATION DATA

DATE ____/____/____ (Mo. Day Yr.) TIME _____ ☐ AM ☐ PM

NAME _____

PHONE NO. _____ ☐ HOME ☐ WORK

LOCATION OF PROBLEM _____

_____

DESCRIBE PROBLEM _____

_____

_____

_____

TAKEN BY →

INSPECTION/ REVIEW REPORT	DATE Mo.	DATE Day	DATE Yr.	REVIEWED BY

☐ CONFIRMED

CONFIRM/ CLARIFY LOCATION _____

WORK REQUIRED _____

_____

_____

_____

SCHEDULING INFORMATION

ACTIVITY CODE		ACTIVITY NAME	
ESTIMATED CREW-DAYS		PRIORITY	1 2 3

MANAGEMENT UNIT	ASSIGNED TO	REQUEST NUMBER

Work Request Backlog Report

The work requests are entered into the computer for the preparation of a list of all uncompleted requests for work. This Work Request Backlog Report presents an organized list of the work request information to help the work schedulers keep track of the various work needs and to supplement their work scheduling efforts. An example of this report is shown in Figure 3-3. An abbreviated version of this report can also be viewed on the computer screen.

FIGURE 3-3
WORK REQUEST BACKLOG DETAIL

NATIONAL PARK SERVICE — WORK REQUEST BACKLOG (DETAIL) — PAGE: 1
MAINTENANCE MANAGEMENT — DATE: 01/05/87
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

ACTIVITY CODE	ACTIVITY NAME	REQ TYP	PRI	REQ NO	REQ DATE	AGE WKS	INSP BY	LOCATION/WORK DESCRIPTION/NOTES	EST CD	EST COST
4160	PAINT EXT SURFACE	M	3	86021	11/02/86	8	DG	ADMINISTRATION BLDG ENTRANCE	2.0	827
		O	3	86043	11/17/86	10	DG	QUARTERS UNIT 201	4.0	1653
								TOTAL:	6.0	2480
4310	MAIN/REP ROOF COV	O	1	86067	12/14/86	2	RL	RANGER HEADQUARTERS ABOVE OFFICE 101	1.0	838
		M	3	86053	10/24/86	9	DG	QUARTERS UNIT 312	3.0	2514
		M	3	86024	10/30/86	8	JB	QUARTERS UNIT 260	2.0	1676
								TOTAL:	6.0	5028
4790	GEN BLDG UTIL MTCE	O	2	86061	12/15/86	2	RL	LEAK AT WATER METER - QUARTERS NO. 214	2.0	248
								TOTAL:	2.0	248
4990	GEN BLDG MTCE	V	2	86054	12/06/86	3	DF	BROKEN RAILING AT VISITOR CENTER ENTRANCE	1.0	124
		M	2	86048	12/06/86	3	RL	SIDING ON QUARTERS UNIT 110	2.0	248
		O	3	86037	11/10/87	7	RL	DOOR ON ENTRANCE KIOSK	1.0	124
								TOTAL:	4.0	496
								MGMT UNIT TOTAL:	18.0	8252

Work Scheduling

Supervisors for each management unit are to prepare a written schedule outlining their plans for the next two weeks. The primary goals of work scheduling are:

- to do the correct amount of work;
- to do work when it should be done--in accordance with management priorities and decisions;
- to do the work where it should be done;
- to do the work with the best combination of personnel, equipment, and materials; and
- to coordinate the work as necessary with other work groups for overall organization, effectiveness and efficiency.

A Bi-Weekly Schedule (Form 10-215) is to be used for preparing this schedule and is illustrated in Figure 3-4.

All schedulers should meet regularly with the Chief of Maintenance to review and discuss their plans for the next two weeks. This review meeting will provide an opportunity to coordinate work activities, use of special equipment, and personnel. At this session, the Chief of Maintenance should provide guidance and direction for the work activity plans as needed and ultimately should approve the schedules.

As appropriate, the Chief of Maintenance can then use the schedules to communicate the planned maintenance activities to the rest of the park organizations. In this manner, any conflicts between maintenance operations and other park activities can be identified and minimized.

Assigning Work

The work scheduling effort will not be effective unless the schedule is used on a daily basis for assigning and dispatching work crews. Work assignments normally should be made for emergency work, if any, then work from the schedule, or alternative work if bad weather, equipment breakdown, or other situations prevent doing the scheduled work.

Daily Work Reports (Form 10-216) can be prepared in advance with the work to be performed, location, special instructions and labor, equipment and materials to use. A copy of any work request related to the work assigned may also be given to the crew leader.

The work assignment should be reviewed with the crew leader in whatever detail is necessary to assure complete understanding of what is to be done, where, how, what personnel and equipment to use, and expected results.

FIGURE 3-4
BI-WEEKLY SCHEDULE

FORM 10-215
(January 1987)

Page ___ of ___

U.S. Department of the Interior
National Park Service
Maintenance Management
BI-WEEKLY SCHEDULE

EST. EMPLOYEE DAYS AVAIL. FOR WORK			SCHEDULED/ESTIMATED LEAVE DAYS IN PERIOD
TYPE	NO. OF DAYS	TOTAL DAYS	
Perm.	____ x ____	= ____	
Pt. Time	____ x ____	= ____	
____	____ x ____	= ____	
____	____ x ____	= ____	
____	____ x ____	= ____	
TOTAL DAYS AVAILABLE		–	=

FOR PERIOD FROM _____ (Date) TO _____ (Date) MGMT. UNIT. _____

PLANNED BY _____ (Date)

NET ESTIMATED AVAILABLE EMPLOYEE DAYS

APPROVED BY _____ (Date)

	PLANNED WORK ITEMS			NOTES/COMMENTS ADDITIONAL INFORMATION	EST. PERSON DAYS REQUIRED	CALENDAR													
	ACTIVITY		LOCATION			S	M	T	W	T	F	S	S	M	T	W	T	F	S
	CODE	NAME																	
1																			1
2																			2
3																			3
4																			4
5																			5
6																			6
7																			7
8																			8
9																			9
10																			10
						TOTAL ESTIMATED PERSON DAYS REQUIRED													

Section 4
Work Controlling Procedures

Section 4

WORK CONTROLLING PROCEDURES

Maintenance Management work evaluation and control consist of collecting, evaluating and using information to aid park management efforts and responsibilities. Park managers and supervisors are provided the information necessary to evaluate actual and planned work accomplishment and costs. Management actions based on these evaluations can be taken to help achieve park maintenance objectives.

Work reports are completed by the maintenance personnel to record work accomplished and the related labor and equipment hours and materials used. These data are compiled and entered into the Maintenance Management computer process.

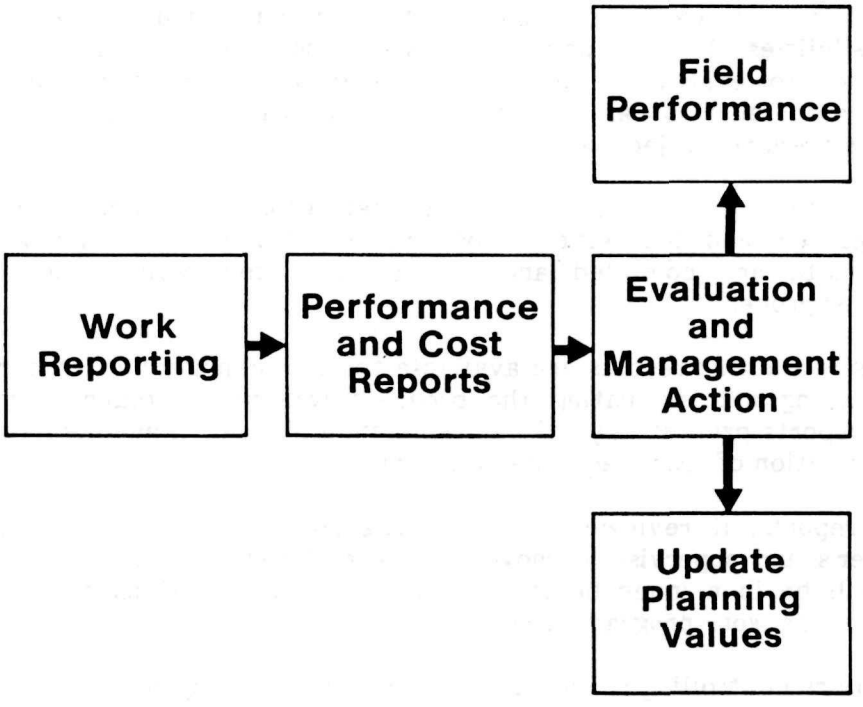
Various evaluation reports are available for the managers and supervisors to use in analyzing and evaluating the progress toward the planned work program. These reports present key information concerning work accomplishments, costs, and utilization of labor, equipment and materials.

These reports, if reviewed and used regularly, will substantially improve the manager's and supervisor's knowledge of maintenance activities. As a result, they will be in a much better position to make decisions and take action on maintenance work program issues.

These work controlling procedures are illustrated in Figure 4-1.

FIGURE 4-1
WORK CONTROLLING PROCEDURES FLOWCHART

Controlling



WORK REPORTING

Reporting of work accomplished provides the data required for preparing various performance evaluation reports for park managers and supervisors. The Daily Work Report (Form 10-216), shown in Figure 4-2, is used for this work reporting process. As work is completed or at the end of the day, the crew leader completes the following information on the report:

- what work was done, by specific activity;
- where it was done, by location;
- how much was done, by work measurement unit; and
- what labor, equipment and materials were used to complete the work.

The completed and reviewed work reports are then accumulated and organized for entering the data into the Maintenance Management computer system. This process should occur regularly -- at least once a week -- to enable the timely preparation of Maintenance Management evaluation reports.

FIGURE 4-2
DAILY WORK REPORT

FORM 10-216
(January 1987)

U.S. Department of the Interior National Park Service Maintenance Management **DAILY WORK REPORT**	PARK AREA					
	DATE			MGMT. UNIT	REF. NO.	
	MO.	DAY	YR.			

ACTIVITY CODE			
ACTIVITY NAME			
WORK REQUEST #'S Circle if Completed			
LOCATION/SPECIAL INSTRUCTIONS Use Back If Needed			

LABOR Code	Class/Name	REG. HRS	PREMIUM CODE	PREMIUM HRS	REG. HRS	PREMIUM CODE	PREMIUM HRS	REG. HRS	PREMIUM CODE	PREMIUM HRS
		.		.	.		.	.		.
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EQUIPMENT Code	Class/Unit #	HRS. USED	NOTES	HRS. USED	NOTES	HRS. USED	NOTES
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MATERIAL Code	Class	QTY. USED	UNIT OF MEASURE	QTY. USED	UNIT OF MEASURE	QTY. USED	UNIT OF MEASURE
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ACCOMPLISHMENT	QTY.	LOCATION CODE	QTY.	LOCATION CODE	QTY.	LOCATION CODE
Work Notes: (Use Back if Needed)	.		.		.	
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	.		.		.	
WORK UNITS 〉						

ASSIGNED TO		SIGNATURE		REVIEWED BY	

EVALUATION REPORTS

Performance evaluation reports are based on the actual work accomplished and the park's planned work program. These reports present comparisons of actual-versus-planned data for work quantities and efforts, costs, and productivities. The performance on work request completion is summarized in one report. Another report presents various combinations of location and work activity information. Figure 4-3 lists the Maintenance Management evaluation reports.

The following sections present brief descriptions of each report and a typical example of each. For each report, there are various options or levels of detail and summary as well as the management unit(s) to be included in the report. Detailed report descriptions, item-by-item explanations and procedures for preparing the reports are outlined in the Operations Manual and the Computer User Manual.

Figure 4-3

LIST OF MAINTENANCE MANAGEMENT EVALUATION REPORTS

	Figure
Work Calendar Status Report	4-4
Performance Report	4-5
On Screen Activity Performance	4-6
* Budget Status Reports	4-7, 4-8
Labor, Equipment and Materials Utilization Reports	4-9 through 4-14
Work Request Completion Analysis	4-15
* Location Maintenance Report	4-16

* These reports are also available for display on the computer screen. Refer to the Computer User Manual for specific instructions to view the report on the screen.

Work Calendar Status Report

The Work Calendar Status Report, shown in Figure 4-4, displays the planned and actual crew days by month for each activity. Cumulative data for crew days, average daily production and work quantities are also shown for each activity.

The report is generally intended for those individuals doing the work scheduling to provide them with current data on work program status. Each management supervisor or work scheduler will receive his or her respective report to coincide with his or her scheduling effort. In this way, the schedulers will be able to tie this information together with their work needs in the work schedules.

FIGURE 4-4
WORK CALENDAR STATUS REPORT

NATIONAL PARK SERVICE — WORK CALENDAR STATUS — PAGE: 1
MAINTENANCE MANAGEMENT — PERIOD FROM 10/01/86 TO 12/31/86 — DATE: 01/05/87
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

ACTIVITY CODE	NAME/ANNUAL WORK QTY	CR SZ		CREW DAYS - PLANNED AND ACTUAL OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANNUAL TOTAL	TO DATE CD	ADP	AWQ
4160	PAINT EXT SURFACE	2	PL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	20.0	20.0	15.0	95.0	0.0	700.0	0.0
	66720 SQ FT		AC	2.0	2.0	0.0											4.0	350.0	1400.0
4310	MAIN/REP ROOF COV	4	PL	2.0	2.0	2.0	2.0	2.0	2.0	4.0	4.0	4.0	4.0	0.0	0.0	28.0	6.0	4.0	24.0
	110 SQUARE		AC	1.0	4.0	4.0											9.0	3.0	27.0
4790	GEN BLDG UTIL MTCE	1	PL	6.0	6.0	6.0	6.0	6.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	90.0	18.0	8.0	144.0
	720 PERS HR		AC	8.0	7.0	6.0											21.0	8.0	168.0
4990	GEN BLDG MTCE	1	PL	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	10.0	10.0	10.0	150.0	30.0	8.0	240.0
	1200 PERS HR		AC	10.0	12.0	8.0											30.0	8.0	240.0
9120	SUPERVISION	1	PL	18.0	18.0	18.0	18.0	18.0	18.0	18.0	19.0	20.0	20.0	20.0	20.0	225.0	54.0	8.0	432.0
	1800 PERS HR		AC	18.0	18.0	18.0											54.0	8.0	432.0

Performance Report

The Performance Report, shown in Figure 4-5, is the primary report used to evaluate progress toward work program objectives. Comparison of planned and actual performance is provided for five key elements of each activity -- person days, work accomplishment, average daily production, total cost and unit cost.

Generally, the report is intended for the Chief of Maintenance for a monthly review and evaluation of the organization's accomplishments and performance.

FIGURE 4-5
PERFORMANCE REPORT

NATIONAL PARK SERVICE
MAINTENANCE MANAGEMENT
BISON NATIONAL PARK

PERFORMANCE REPORT
PERIOD FROM 10/01/86 TO 12/31/86
MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

PAGE: 1
DATE: 01/05/87

CODE	ACTIVITY NAME/WORK UNIT	PERFORMANCE INDICATOR	CURRENT MONTH PERFORMANCE PLAN	ACTUAL	PCT	EXCEPTION SET ALL AC	YEAR TO DATE PERFORMANCE PLAN	ACTUAL	PCT	EXCEPTION SET ALL AC
4160	PAINT EXT SURFACE	PERSON DAYS	0.00	0.00	100		4.00	6.00	150	*
	SQ FT	ACCOMPLISHMENT	0.00	0.00	100		1400.00	1400.00	100	
		AVG DAILY PROD	0.00	0.00	100		700.00	466.00	67	*
		TOTAL COST ($)	0.00	0.00	100		840.00	1236.00	147	*
		UNIT COST ($)	0.00	0.00	100		0.60	0.88	147	*
4310	MAIN/REP ROOF COV	PERSON DAYS	0.00	4.00	+++	*	32.0	27.00	84	
	SQUARE	ACCOMPLISHMENT	0.00	2.00	+++	*	32.0	36.00	113	
		AVG DAILY PROD	0.00	2.00	+++	*	3.9	3.00	76	
		TOTAL COST ($)	0.00	640.00	+++	*	6816.00	7110.00	104	
		UNIT COST ($)	0.00	320.00	+++	*	213.00	263.00	124	
4990	GEN BLDG MAINT	PERSON DAYS	2.00	1.00	50	*	8.00	6.00	75	
	PERS HR	ACCOMPLISHMENT	16.00	8.00	50	*	64.00	48.00	75	*
		AVG DAILY PROD	8.00	8.00	100		8.00	8.00	100	
		TOTAL COST ($)	248.00	120.00	48	*	920.00	744.00	75	*
		UNIT COST ($)	15.50	15.00	97		14.40	15.50	108	
5190	GEN WATER SYS MAINT	PERSON DAYS	2.00	2.00	100		6.00	2.00	33	*
		ACCOMPLISHMENT	16.00	16.00	100		48.00	16.00	33	*
		AVG DAILY PROD	8.00	8.00	100		8.00	8.00	100	
		TOTAL COST ($)	216.00	230.00	106		648.00	230.00	35	*
		UNIT COST ($)	13.50	14.38	106		13.50	14.38	106	
9210	LEAVE	PERSON DAYS	12.00	10.00	83		30.00	25.00	83	
	PERS HR	ACCOMPLISHMENT	96.00	80.00	83		240.00	200.00	83	
		AVG DAILY PROD	8.00	8.00	100		8.00	8.00	100	
		TOTAL COST ($)	1488.00	1240.00	83		3720.00	3100.00	83	
		UNIT COST ($)	15.50	15.50	100		15.50	15.50	100	
9230	TRAINING	PERSON DAYS	6.00	7.00	117		14.00	14.00	100	
	PERS HR	ACCOMPLISHMENT	48.00	56.00	117		112.00	112.00	100	
		AVG DAILY PROD	8.00	8.00	100		8.00	8.00	100	
		TOTAL COST ($)	744.00	868.00	117		1736.00	1736.00	100	
		UNIT COST ($)	15.50	15.50	100		15.50	15.50	100	
MGMT UNIT TOTALS:		PERSON DAYS	22.00	24.0	109		94.0	80.00	85	
		TOTAL COST ($)	2696.00	3098.00	115		14680.00	14156.00	96	

On-Screen Activity Performance

This screen report, shown in Figure 4-6, is designed to provide monthly and cumulative performance data for an activity in a short time without need to print a report. Comparisons of planned and actual performance are provided for these items:

- Accomplishment
- Person Days
- Crew Days
- Average Daily Production
- Labor Cost
- Equipment Cost
- Material Cost
- Total Cost
- Unit Cost
- Cost Per Crew Day
- Desired Service Level
- Planned Service Level
- Actual Service Level

Park managers and supervisors can use this process to quickly review the status of an activity and, if necessary, get a printed version of the data.

FIGURE 4-6
ON SCREEN ACTIVITY PERFORMANCE REPORT

ON SCREEN ACTIVITY PERFORMANCE REPORT DATE: 01/05/87
PERIOD FROM 10/01/86 TO 12/31/86

ACTIVITY: 4310 MAIN/REP ROOF COV

WORK UNIT: SQUARE INVENTORY: 1100 SQUARES

PERFORMANCE INDICATOR	MONTH PLAN	MONTH ACTUAL	MONTH PCT	YEAR TO DATE PLAN	YEAR TO DATE ACTUAL	YEAR TO DATE PCT
ACCOMPLISHMENT	0.0	2.0	+++	32.0	27.0	84
PERSON DAYS	0.0	4.0	+++	32.0	36.0	113
CREW DAYS	0.0	1.0	+++	8.0	9.0	113
AVG DAILY PRODUCTION	0.0	1.0	+++	3.9	3.0	76
LABOR COST ($)	0	496	+++	3967	4087	103
EQUIPMENT COST($)	0	64	+++	1581	1692	107
MATERIAL COST ($)	0	100	+++	1268	1331	105
TOTAL COST ($)	0	640	+++	6816	7110	104
UNIT COST ($/SQUARE)	0	320	+++	213	263	124
COST/CREW DAY ($)	0	640	+++	838	790	94
SERVICE LEVEL (SQUARE/SQUARE)						
DESIRED				0.20		
PLANNED				0.10		
ACTUAL TO DATE					0.02	

Budget Status Report (Cost Summary)

The Budget Status Report is prepared in two levels of detail. The first of these, the Cost Summary, is shown in Figure 4-7. The report displays the planned and actual total costs for each activity for the most recent month and the year to date. An annual projection is calculated to provide an indication of the status of the annual budget based on the year-to-date expenditures.

This report can be prepared as required to provide an overview of budget status. In reviewing this report, it is important to remember that the costs shown are based on average cost data. Therefore these data are not precisely accurate and should not be used as if they were. The values are accurate to the extent that the average hourly rates and unit costs are accurate. These data will still be useful for the timely overview of work program cost data.

An abbreviated version of this report can be viewed on the computer screen instead of printing a report. All items except for the Annual Projection and Exception will be displayed. Refer to the Computer User Manual for the instructions to select this process.

FIGURE 4-7
BUDGET STATUS REPORT (SUMMARY)

NATIONAL PARK SERVICE
MAINTENANCE MANAGEMENT
BISON NATIONAL PARK

BUDGET STATUS REPORT (COST SUMMARY)
PERIOD FROM 10/01/86 TO 12/31/86
MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

PAGE: 1
DATE: 01/05/87

ACTIVITY CODE	ACTIVITY NAME	1-MONTH PLAN($)	1-MONTH ACTUAL($)	1-MONTH DIFF($)	2-YEAR TO DATE PLAN($)	2-YEAR TO DATE ACTUAL($)	2-YEAR TO DATE DIFF($)	3-ANNUAL PROJECTION PLAN($)	3-ANNUAL PROJECTION ACTUAL($)	3-ANNUAL PROJECTION DIFF($)	EXCEPTIONS 1 2 3 NOT SET
4160	PAINT EXT SURFACE	0	0	0	840	1236	-396	39270	39666	-396	
4310	MAIN/REP ROOF COV	0	640	-640	6816	7110	-294	23467	23761	-294	
4790	GEN BLDG UTIL MTCE	785	800	- 15	2355	2300	55	11160	11105	55	
4990	GEN BLDG MTCE	248	120	128	920	744	176	18600	18924	176	
9120	SUPERVISION	2880	2880	0	8640	8640	0	36000	36000	0	
	MGMT UNIT TOTALS:	3913	4440	-527	19571	20030	-459	128497	128956	-459	

Budget Status Report (Cost Detail)

The second format of the Budget Status Report, the Cost Detail, is illustrated in Figure 4-8. This report presents a comparison of planned versus actual costs for labor, equipment, material and total costs for the month and year to date for each activity. This report supplements the Cost Summary report and provides data to assess the status of the maintenance budget. Potential problem areas can be identified and budget redistribution and priority strategies can be developed with these data.

This report should be prepared on an as-needed basis to support the Chief of Maintenance's needs for maintenance activity cost details.

An abbreviated version of this report can be viewed on the computer screen instead of printing the report. All items except for the Total Cost will be displayed. Refer to the Computer User Manual for the instructions to select this process.

FIGURE 4-8
BUDGET STATUS REPORT (DETAIL)

NATIONAL PARK SERVICE — BUDGET STATUS REPORT (COST DETAIL) — PAGE: 1
MAINTENANCE MANAGEMENT — PERIOD FROM 10/01/86 TO 12/31/86 — DATE: 01/05/87
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

ACTIVITY CODE	ACTIVITY NAME		LABOR COST PLAN($)	LABOR COST ACTUAL($)	LABOR COST DIFF($)	EQUIPMENT COST PLAN($)	EQUIPMENT COST ACTUAL($)	EQUIPMENT COST DIFF($)	MATERIAL/OTHER COST PLAN($)	MATERIAL/OTHER COST ACTUAL($)	MATERIAL/OTHER COST DIFF($)	TOTAL COST PLAN($)	TOTAL COST ACTUAL($)	TOTAL COST DIFF($)
4160	PAINT EXT SURFACE													
		MTH	0	0	0	0	0	0	0	0	0	0	0	0
		YTD	489	717	-228	195	284	-89	156	235	-79	840	1236	-396
4310	MAIN/REP ROOF COV													
		MTH	0	-400	400	0	91	-91	0	179	-179	0	640	-640
		YTD	3967	4087	-120	1581	1692	-111	1268	1331	-63	6816	7110	-294
4790	GEN BLDG UTIL MTCE													
		MTH	658	670	-12	95	100	-5	32	30	2	785	800	-15
		YTD	1975	1915	60	285	285	0	95	100	-5	2355	2300	55
4990	GEN BLDG MTCE													
		MTH	208	100	108	20	10	10	20	10	10	248	120	128
		YTD	770	624	146	75	60	15	75	60	15	920	744	176
9120	SUPERVISION													
		MTH	2160	2160	0	720	720	0	0	0	0	2880	2880	0
		YTD	6480	6480	0	2160	2160	0	0	0	0	8640	8640	0
MGMT UNIT TOTALS														
		MTH	3026	3330	-304	835	921	-86	52	219	-167	3913	4440	-527
		YTD	13681	13823	-142	4296	4481	-185	1594	1726	-132	19571	20030	-459

Labor, Equipment and Materials Utilization Reports

The utilization reports provide details and summaries of the labor, equipment, materials or other resources used to accomplish the work activities. These six reports can be prepared on an as-needed basis to review the use of labor, equipment and materials in comparison with the original plan. Potential problems or needs for modifying the plan should be readily identifiable. These data should be particularly valuable in the regular review and update of the planning guidelines and related estimates of labor, equipment and materials required.

These labor, equipment and materials utilization reports provide information on resource use by resource type and work activity. There are detail and summary reports for each of the labor, equipment or materials/other resources. The detail reports provide the activity-by-activity information while the summary reports provide the comparison of planned versus actual total usage. These reports can be quite long and voluminous. They should be prepared only on an as-needed basis. The report selection process enables one to select only that set of reports that is required.

The labor utilization reports provide usage data by labor classification and month plus total person days for the year or period reported. The detailed labor usage reports provide information on what work activities were performed by each labor classification. These data can be used to evaluate planning data or restructure work assignments by labor classifications. Summary labor usage reports compare planned and actual labor distribution by month and labor classification. Months of understaffing, or overstaffing, by classification are readily apparent.

The equipment usage reports show the number of hours each type of equipment is used and the work activity performed. The planned and actual hours of equipment use by type and month are shown. Underutilization of equipment by type and month is easily identified. The detailed equipment usage reports show what work activities each type of equipment was used for and the number of hours used per month. These data can be used to compare, and modify as required, the equipment resources planned by work activity.

The material utilization reports provide data by type of material or other resource and work activity. Planned and actual use quantities by month and total for the year, or period reported, are shown. The summary report combines the usage for all work activities and shows the total for each material type. These utilization reports provide the basis to evaluate and adjust the planning data for material use by work activity and standard crew day usage.

Each of the three detail reports, presented in Figures 4-9 through 4-11, are similar in format. The summary reports are also similar in format and are shown in Figures 4-12 through 4-14.

FIGURE 4-9
LABOR UTILIZATION REPORT (DETAIL)

NATIONAL PARK SERVICE — LABOR UTILIZATION REPORT (DETAIL) — PAGE: 1
MAINTENANCE MANAGEMENT — DATE: 01/05/87
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

ACTIVITY CODE	ACTIVITY NAME	PERSON DAY USE BY MONTH OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL USE	TOTAL COST
					SUPERVISOR 1100										
9120	SUPERVISION	18.0	18.0	18.0										54.0	6480
9130	MTCE INSPECTION	1.0	1.0	1.0										3.0	360
9190	GEN ADMIN	1.0	1.0	1.0										3.0	360
	TOTAL	20.0	20.0	20.0										60.0	7200
					MAINT WKR FRMN 1440										
4160	PAINT EXT SURFACE	1.0	1.0	0.0										2.0	253
4310	MAIN/REP ROOF COV	1.0	2.0	2.0										5.0	632
4790	GEN BLDG UTIL MTCE	1.0	1.0	1.0										3.0	379
4990	GEN BLDG MTCE	1.0	2.0	2.0										5.0	632
	TOTAL	4.0	6.0	5.0										15.0	1897
					MAINT WKR 2000										
4160	PAINT EXT SURFACE	4.0	4.0	0.0										8.0	800
4310	MAIN/REP ROOF COV	4.0	8.0	8.0										20.0	2000
4790	GEN BLDG UTIL MTCE	2.0	2.0	5.0										9.0	900
4990	GEN BLDG MTCE	8.0	8.0	9.0										25.0	2500
	TOTAL	18.0	22.0	22.0										62.0	6200

FIGURE 4-10
EQUIPMENT UTILIZATION REPORT (DETAIL)

NATIONAL PARK SERVICE — EQUIPMENT UTILIZATION REPORT (DETAIL) — PAGE: 1
MAINTENANCE MANAGEMENT — DATE: 01/05/86
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

ACTIVITY CODE	ACTIVITY NAME	EQUIPMENT HOUR USE BY MONTH OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL USE	TOTAL COST
		PICKUP TRUCK 3030													
4160	PAINT EXT SURFACE	8.0	8.0	0.0										16.0	12
4310	MAIN/REP ROOF COV	14.0	16.0	16.0										46.0	35
4790	GEN BLDG UTIL MTCE	30.0	40.0	48.0										118.0	89
4990	GEN BLDG MTCE	54.0	60.0	80.0										194.0	146
9120	SUPERVISION	130.0	128.0	126.0										384.0	288
	TOTALS	236.0	252.0	270.0										758.0	570

FIGURE 4-11
MATERIAL/OTHER UTILIZATION REPORT (DETAIL)

NATIONAL PARK SERVICE — MATERIAL/OTHER UTILIZATION REPORT (DETAIL) — PAGE: 1
MAINTENANCE MANAGEMENT — DATE: 01/05/86
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

ACTIVITY CODE	NAME	MATERIAL/OTHER USE BY MONTH OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL USE	TOTAL COST
						LITTER BAGS		5590	NO BAGS						
1440	ROAD LITTER PICKUP	200.0	200.0	100.0										500.0	250
2230	COLLECT/REMOV LITTER	40.0	40.0	10.0										90.0	45
3200	PICKUP LITTER	40.0	40.0	40.0										120.0	60
	TOTALS	280.0	280.0	150.0										710.0	355
						PAINT		6290	GALLON						
4160	PAINT EXT SURFACE	30.0	20.0	0.0										50.0	900
4260	PAINT INT SURFACE	0.0	10.0	0.0										10.0	180
	TOTALS	30.0	30.0	0.0										60.0	1080

FIGURE 4-12
LABOR UTILIZATION REPORT (SUMMARY)

NATIONAL PARK SERVICE — LABOR UTILIZATION REPORT (SUMMARY) — PAGE: 1
MAINTENANCE MANAGEMENT — DATE: 01/05/87
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

LABOR RESOURCE CODE	NAME		PERSON DAYS BY MONTH OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL USE	TOTAL COST
1100	SUPERVISOR	PL	20.0	20.0	20.0	20.0	19.0	21.0	21.0	21.0	22.0	20.0	21.0	21.0	246.0	29520
		AC	20.0	20.0	20.0										60.0	7200
1440	MAINT WRK FRMN	PL	5.0	5.0	5.0	5.0	5.0	6.0	10.0	30.0	30.0	28.0	24.0	19.0	172.0	21755
		AC	4.0	6.0	5.0										15.0	1897
2000	MAINT WKR	PL	19.0	19.0	19.0	19.0	19.0	22.0	36.0	54.0	54.0	46.0	34.0	29.0	370.0	37000
		AC	18.0	22.0	22.0										62.0	6200

FIGURE 4-13
EQUIPMENT UTILIZATION REPORT (SUMMARY)

NATIONAL PARK SERVICE
MAINTENANCE MANAGEMENT
BISON NATIONAL PARK

EQUIPMENT UTILIZATION REPORT (SUMMARY)
PERIOD FROM 10/01/86 TO 12/31/86
MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

PAGE: 1
DATE: 01/05/87

EQUIPMENT CODE	RESOURCE NAME		EQUIPMENT HOURS BY MONTH OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL USE	TOTAL COST
3030	PICKUP TRUCK	PL	280.0	280.0	280.0	280.0	272.0	312.0	392.0	536.0	544.0	464.0	456.0	400.0	4496.0	3372
		AC	236.0	252.0	270.0										758.0	569
3090	DUMP TRUCK (5CY)	PL	160.0	160.0	80.0	80.0	80.0	160.0	240.0	320.0	320.0	320.0	320.0	240.0	2480.0	3100
		AC	184.0	170.0	60.0										414.0	518

FIGURE 4-14
MATERIAL/OTHER UTILIZATION REPORT (SUMMARY)

NATIONAL PARK SERVICE — MATERIAL/OTHER UTILIZATION REPORT (SUMMARY) — PAGE: 1
MAINTENANCE MANAGEMENT — DATE: 01/05/87
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

MATERIAL/OTHER RESOURCE CODE	NAME/UNIT		MATERIAL/OTHER USE BY MONTH OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL USE	TOTAL COST
5590	LITTER BAG	PL	300.0	240.0	140.0	140.0	240.0	260.0	320.0	460.0	660.0	880.0	880.0	660.0	5180.0	2590
	NO BAGS	AC	280.0	280.0	150.0										710.0	355
6290	PAINT	PL	40.0	40.0	40.0	40.0	40.0	40.0	40.0	120.0	120.0	80.0	80.0	60.0	740.0	13320
	GALLON	AC	30.0	20.0	0.0										50.0	900

Work Request Completion Analysis

The Work Request Completion Analysis, shown in Figure 4-15, enables the review and analysis of information related to completed work requests. These data provide an indication of the maintenance division's effectiveness in responding to the various requests. The volume of requests, by activity, can also be used in conjunction with an assessment of the maintenance work program and the levels of service provided and anticipated.

FIGURE 4-15
WORK REQUEST COMPLETION ANALYSIS

NATIONAL PARK SERVICE — WORK REQUEST COMPLETION ANALYSIS — PAGE: 1
MAINTENANCE MANAGEMENT — DATE: 12/29/86
BISON NATIONAL PARK — MGMT UNIT: BLDG SOUTHERN DISTRICT BUILDINGS

ACTIVITY CODE	ACTIVITY NAME	NO OF REQUESTS RECEIVED	NO OF REQUESTS COMPLETED	PCT COMPL	AVG RESPONSE TIME IN WKS	NO RECEIVED BY REQ TYPE VISITOR	MAINT	OTHER
4160	PAINT EXT SURFACE	8	5	63	4.1	1	5	2
4310	MAIN/REP ROOF COV	7	4	57	1.3	0	3	4
4790	GEN BLDG UTIL MTCE	4	3	75	1.0	0	3	1
4990	GEN BLDG MTCE	13	9	69	1.6	6	5	2
	MGMT UNIT TOTALS:	32	21	66	2.1	7	16	9

Location Maintenance Report

The Location Maintenance Report provides activity accomplishment and cost data for specific locations as designated by the park and as recorded on daily work reports. These data are organized and presented for the current month, the year to date, and for the time period since the date when the first activity information was recorded for the location.

This report is available in two printed formats. The first of these, shown in Figure 4-16, presents the data sorted by location and then by activity. The other format, not shown, presents the same data but organized by activity and then by location.

In addition, abbreviated versions of these reports can be viewed on the screen instead of printing a report. In the screen format, only the cost data are presented. The work quantity data will not be shown, due to screen space constraints.

These data, in printed or screen format, can also be selected and compiled by location "Type". With this capability reports can be prepared for the class of locations such as housing, utilities, historic, etc.

These reports provide park managers with the information necessary to prepare Region and WASO required reports relating to accomplishments and costs for specific locations or classes of locations. These reports may also satisfy park needs for data to use in conjunction with clearing accounts.

FIGURE 4-16
LOCATION MAINTENANCE REPORT

NATIONAL PARK SERVICE — LOCATION MAINTENANCE REPORT — PAGE: 1
MAINTENANCE MANAGEMENT — PERIOD FROM 10/01/86 TO 12/31/86 — DATE: 01/05/87
BISON NATIONAL PARK — LOCATION: B2110000 BUILDING 2110

LOCATION/TYPE/ACTIVITY CODES	NAMES		MONTH ACCOMPLISHMENT QTY	UNIT	COST	YEAR TO DATE ACCOMPLISHMENT QTY	UNIT	COST	COST FROM DATE OF FIRST ENTRY
B2110000	BUILDING 2110								
H	HISTORIC								
4160	PAINT EXT SQUARE	MGMT UNIT: BLDG	0.0	SQ FT	0	0.0	SQ FT	0	2980
4310	MAIN/REP ROOF COV	MGMT UNIT: BLDG	4.0	SQUARE	860	10.0	SQUARE	2265	7432
4990	GEN BLDG MTCE	MGMT UNIT: BLDG	56.0	PERS HR	846	152.0	PERS HR	2380	12614
9120	SUPERVISION	MGMT UNIT: BLDG	8.0	PERS HR	154	20.0	PERS HR	340	3255
				TOTALS:	1860			4985	26281

WORK EVALUATION AND CONTROL

Basic Concepts

Evaluation of maintenance work performance is a responsibility of all levels of the maintenance organization. Maintenance personnel compare work completion with work methods and production guidelines shown on the activity planning guidelines. Supervisors evaluate work completion through field inspections, review of completed work reports and evaluation reports. Park managers evaluate work completion and work program status through field inspections and reviews of evaluation reports, budget status reports and work request analyses.

Each management level has varying degrees of evaluation responsibilities and each level requires varying types of information for such evaluations. Generally, supervisors require information related to quality and quantity of work completed; Chiefs of Maintenance require information on comparisons of planned to actual work accomplishment as well as budget performance; the Park Superintendent requires information concerning the status of the maintenance budget and the status of the maintenance work program.

Generally, work control involves those actions directed toward bringing maintenance operations in line with the goals and objectives in the maintenance work program. Actual control is exercised by managers and is based upon regular, periodic reviews of after-the-fact information obtained through the work reporting, data entry and report preparation processes. These regular reviews help to ensure that corrective actions can be defined and taken in time for effective control of the maintenance work program.

Evaluation Procedures

There are no hard and fast, step-by-step, procedures to follow for each of the various reviews and evaluations. However, two important points to consider when reviewing management reports and maintenance operations are the significance and type of each activity being reviewed.

Significance of Activity. Those activities that require a significant percentage of the workload and budget deserve more attention in the evaluation process. For example, if the top 20 activities account for 70 to 80 percent of the workload and budget, then more emphasis should be placed on the evaluation of these "significant" activities. There may also be other activities that are significant for the park management for reasons other than budget or labor effort. Effective control of these activities provides a good basis for effective control of the total work program.

Type of Activity. Some maintenance activities are extremely important and as much work as is needed must be performed, even if this requires performing more than the planned amount of work. Snow removal might be an example of this kind of work. For some activities, such as painting, it is possible and may be necessary to do only that amount of work that is planned. Finally, for other

activities (tree planting, perhaps) a certain degree of flexibility may exist--it may not be as important that all of the planned work be accomplished.

Keeping these two points in mind will help to determine the significance of any deviation or exceptions that are identified in the evaluation process. For example, a 100 percent overrun or underrun on an activity that accounts for one tenth of one percent of the workload and budget is not nearly as critical as a 15 percent overrun or underrun of an activity that accounts for 10 percent of the workload and budget.

Exception Reporting and Acceptable Deviation Levels. Within the planning process, an acceptable deviation level is established for each activity. With these criteria, managers and supervisors can address the previous points and focus their attention on the important activities.

For each activity, one level of acceptable deviation can be set. This level defines the range of acceptable performance above and below 100 percent when comparing actual to planned data. For example, with a deviation level set at 15 percent, the acceptable range of performance would be from 85 to 115 percent of plan. Performance outside this range is noted as an exception with an asterisk (*).

When all actual versus planned percentage calculations for an activity are within the designated deviation level, the activity data will not be printed.

This deviation level function is not used in all of the evaluation reports. The following reports are the only ones to use this function.

- Performance Report
- Budget Status Report (Cost Summary)

When selecting either of these reports, it is necessary to select which deviation criteria to use in calculating and preparing the report. There are three choices:

1. ACTIVITY-BASED. Use the deviation level as defined for the activity.

2. ALL ACTIVITIES, SAME LEVEL. Establish a new deviation level to apply to all activities. In this case the program will ask for that new deviation percent.

3. NO DEVIATION LEVEL. Ignore all established deviation criteria and print all activities.

The deviation level used for the report will be displayed in the report heading.

Management Action

As a result of work evaluations and field inspections, maintenance managers and supervisors guide the organization toward work program objectives. With frequent reviews of reports and operations, corrective actions can be taken in time to be effective.

A regular review and evaluation of the reports will help identify and direct attention to potential problem areas. It is difficult, however, to positively identify causes of problems and define solutions solely on the basis of the reports. Some general guidelines regarding areas to investigate and possible management actions are summarized in Figure 4-17. These guidelines are provided as examples only, and not intended to be all-inclusive for problem areas and management actions. It is also important to remember that the original plan may need to be corrected or updated due to changing conditions. So, it is always necessary to confirm that the planned value is still valid when making the actual-versus-planned comparisons and evaluations.

Regular observations of work completed, operations in progress and work needs also play an important role in the evaluation process. These field inspections supplement the report review process and help to answer questions raised during the information review. They also are extremely important in the verification or modification of the various planning values for service level, productivity, and work quality.

Park managers and supervisors are expected to apply these work evaluation and control procedures to their respective operations. With these efforts, the "management cycle" has been completed. Use of the planning, organizing, directing and controlling procedures, including an appropriate balance between performance report review and field inspections, will lead to effective maintenance management.

From these efforts, managers and supervisors should expect to realize benefits such as:

- improved productivity;
- better use of available labor, equipment and materials;
- improved records of work accomplished;
- more work accomplished; and
- improved documentation and planning for maintenance work and resource needs.

These benefits and improvements will strengthen the Park Service's abilities to fulfill its objectives to conduct an effective maintenance program and to provide a safe, sanitary, aesthetically pleasing environment for park visitors and employees.

FIGURE 4-17
MAINTENANCE MANAGEMENT INFORMATION EVALUATION GUIDELINES

PERFORMANCE INDICATOR	REPORTED RESULTS	AREAS TO INVESTIGATE	SUGGESTED MANAGEMENT ACTIONS
WORK ACCOMPLISHMENT	LESS THAN PLANNED	1. Failure to report accomplishment 2. Failure to perform necessary work 3. Lack of need to perform work 4. Uncontrollable circumstances that hindered performance 5. Low priority 6. Ineffective or absence of planning and scheduling	Contact crew leader and correct error Supervision and training Confirm plan for work None None Supervision and training
	GREATER THAN PLANNED	1. Overestimating work accomplishment 2. Performing more work than necessary 3. Necessity for more work than planned	Contact crew leader and correct error Supervision and training Ensure authorization
AVERAGE DAILY PRODUCTION	LESS THAN PLANNED	1. Underestimated accomplishment 2. Unusually scattered work areas 3. Less than a full day's accomplishment due to weather or other uncontrollable circumstances 4. Excess quality or poor workmanship 5. Improper method and procedure 6. Less than normal work effort 7. Lack of or ineffective scheduling	Contact crew leader and correct error None None Supervision and training Supervision and training Supervision Supervision and training
	GREATER THAN PLANNED	1. Overestimated accomplishment 2. Unusually concentrated work area 3. Poor quality and/or workmanship 4. Non-standard method and procedure 5. Experimental operation 6. Work effort greater than normal 7. Used more material than required	Contact crew leader and correct error None Supervision and training Evaluate operation as potential new development None Praise Supervision and training
CREW DAYS OR PERSON DAYS	LESS THAN PLANNED	1. Failure to report all person-hours used 2. Failure to perform needed work 3. Work planned, but not needed 4. Using less than the planned crew size for the work 5. Production greater than planned	Contact crew leader and correct error Supervision and training Confirm plan for work Confirm planned crew size, supervision and training See above re average daily production
	GREATER THAN PLANNED	1. Reporting more person hours than used 2. Performing more work than planned 3. Using larger crew size than planned 4. Production less than planned	Contact crew leader and correct error Confirm plan, need for work, supervision and training Verify need for larger crew, confirm plan, supervision and training See above re average daily production
COSTS	LESS THAN PLANNED	1. Failure to perform needed work 2. Failure to report work data 3. Using less resources to do the work than planned 4. Using resources with lower rates or costs than planned 5. Production greater than planned	Supervision and training Contact crew leader and correct error Confirm planning guideline, supervision and training Confirm planning guideline, supervision and training Look at cost details; material costs may offset labor and equipment
	GREATER THAN PLANNED	1. Performing more work than planned 2. Reporting more work than completed 3. Using more resources to do the work than planned 4. Using resources with higher rates or costs than planned 5. Production less than planned	Confirm need for work, supervision and training Contact crew leader and correct error Confirm planning guideline, supervision and training Confirm planning guideline, supervision and training Look at cost details

Reference / Support Materials

Current Reports