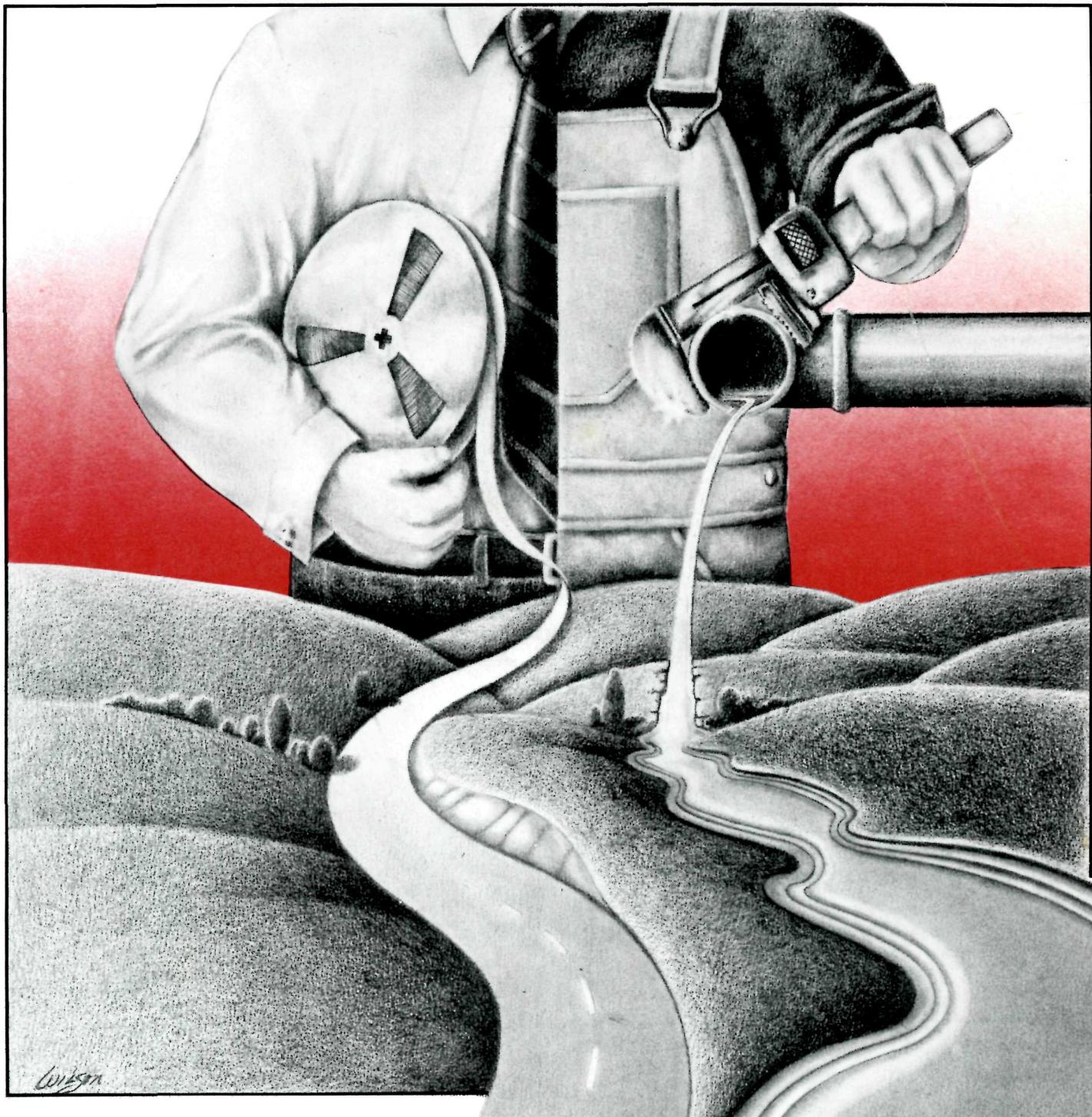


Trends

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Guideline

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Editor: Andy Leon Harney
Editorial Assistant: Tom Shelton
Graphic Designer: Dan Callis
Cover: Tom Wilson

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National Society for Park Resources
Charles H. Odgaard, President
Sondra Kirsch, Executive Secretary

U. S. Department of Interior
Thomas S. Kleppe, Secretary
National Park Service
Gary E. Everhardt, Director
Jean C. Henderer, Chief, Div. of Federal, State and Private Liaison

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Introduction

by Gerald A. Rowe



There has never been any real question about the need for maintenance as part of a park operation. By definition, to maintain means to keep in existence, to preserve, to retain, to keep in a specified state, to keep unimpaired. Another term pertinent to maintenance is depreciation, which refers to decrease in value due to wear and tear. Maintenance is the only antidote to depreciation. While we recognize that depreciation is inevitable, we also know that the life of a facility can be extended manyfold through proper maintenance.

A planned maintenance program can actually earn money. By keeping a system or building operating at peak efficiency through good maintenance practices, you can save extensively in power and fuel costs, and this is extremely important in these days of fuel shortages. Although the above definition describes to some degree the maintenance operation of the National Park Service, it is by no means totally descriptive of the work maintenance people are called upon to do. In fact, "Facilities Engineering Services", or similar terminology, far more accurately describes the increasingly complex, sophisticated and professional nature of "maintenance".

The term maintenance has always been something of a misnomer, and now does not even come close to properly defining the functions fulfilled by most maintenance organizations. The word has always implied, to some, little more than custodial or menial-type work. This obviously and increasingly is simply not the case.

Maintenance is no longer an "also ran" kind of job; it's big business. For example, maintenance accounts for between 40 and 50 percent of all personnel within the National Park Service. These people are responsible for planning and spending about 50 percent of the Park Service's operational budget—estimated at in excess of \$120 million for Fiscal Year 1977.

The need for good maintenance does not go away—rather it expands. For example, adequate maintenance (done on a timely basis) of plumbing fixtures, may extend their lives from three to as much as fifteen years. Corrective treatment of faucets, traps, piping and other fixtures can frequently double their useable lives. The leaking faucet, at one drop each second, doesn't seem like much, but it wastes 2,300 gallons annually. When you add two, or three, or a half-dozen more leaking faucets to that, you quickly have a significant amount of waste. This is especially true if some of those faucets leak hot water. Not only is water wasted, but also the energy used to heat it. The added water may also be causing the sewage treatment plant to operate more than it normally would, thereby using more energy and causing greater wear and tear on the plant.

A leaky water line should receive immediate attention since a small leak can usually be fixed fairly quickly and inexpensively. However, if left to leak, it could become a major break with complete loss of the water supply—frequently at a critical period. Such leaks may also pose a danger to footings, walls, plaster work, and other buildings or structures, with resultant damage being quite expensive to repair.

Another example is a comparison of the cost of a scheduled rehabilitative seal coat on a road, at a cost of \$5,000 per mile on a 10 year cycle, as opposed to continually deferring such a seal coat for an additional 10 years. The cumulative effect of such deferral for another 10 years could possibly necessitate a complete rehabilitation of the whole road section at a cost of perhaps \$50,000 to \$100,000 per mile.

Regular maintenance can be ignored for just so long before it develops into a need for costly major rehabilitation or reconstruction. It's like the TV commercial for automobile oil filters—you can spend \$4 now for an oil filter replacement, or wait until next year and spend \$400 on a motor overhaul. This kind of action further depletes perennially short maintenance budgets. It also precludes the proper application of preventive maintenance and reduces a good maintenance operation to one which simply reacts to breakdowns.

When you tie these things to a steadily increasing inventory of facilities (often acquired in a poor state of repair), they become an almost insurmountable burden.

In recent years, there has also been an extraordinary increase in the amount and type of outside pressures bearing on maintenance operations. All of the new pollution abatement, energy conservation, and other environmental laws and regulations have added tremendously to complexity and cost of these operations.

All of these things point up the need for much more management attention to the needs for maintenance, and for greater recognition of the essential part maintenance plays in the total operation of a park system. It should be evident that maintenance considerations must be an integral part of park planning. This means planning related to the overall budget, to interpretive programs, to needed facilities development, to historic preservation. Such a broad integration of maintenance into the planning process undoubtedly will result in long-term gains in operational efficiency and reductions in operational cost.

To achieve a high level of operational efficiency and reduce the costs of facilities maintenance, a set of performance standards should be developed by park management. The standards would set forth descriptions of the work to be performed and the resources needed (personnel, equipment, materials, and money) to insure effective and economical achievement of the desired levels of maintenance.

The first step in the establishment of standards is an accurate and complete facilities inventory. This inventory, combined with additional personnel and budget information, is the basis for the establishment of a maintenance management program which will provide for: scheduled maintenance instead of breakdown maintenance; assurance that facilities meet their functional requirements; development of realistic budgets based on cost comparisons for similar work; the elimination of over-maintenance and under-maintenance.

A maintenance operation succeeds or fails largely on the basis of its employee's attitudes and capabilities. It follows, therefore, that management must make a particularly strong effort to attract, recruit, and retain good employees. As most park personnel know, park visitors have more direct contact with maintenance personnel than most of the rest of the park staff. In the National Park Service areas, a great many visitors' impressions of an area are formed by the state of maintenance in that location, and by their contacts with maintenance people. Because of this, most other park programs, whether interpretive, educational, or service oriented, simply will not work well, if at all, without the interest and concern of maintenance personnel. Looked at from this point of view, it is obviously imperative that maintenance personnel be included in training related to other than their technical specialty.

Training should be generally broad enough in scope to include not only on-the-job training in operation of equipment and facilities under their direct control, but also training in fundamental human relations. It should be designed to stimulate individual interests and capabilities. Park programs of all types will surely benefit from such stimulation.

An additional point concerning training which should be touched on here is that such cross-fertilization works both ways. In other words, a great deal of benefit can be derived for park programs as a whole by broadening the knowledge of and appreciation for maintenance on the part of other park staff, from management on down. Communication between associates usually develops respect and understanding for each other's work.

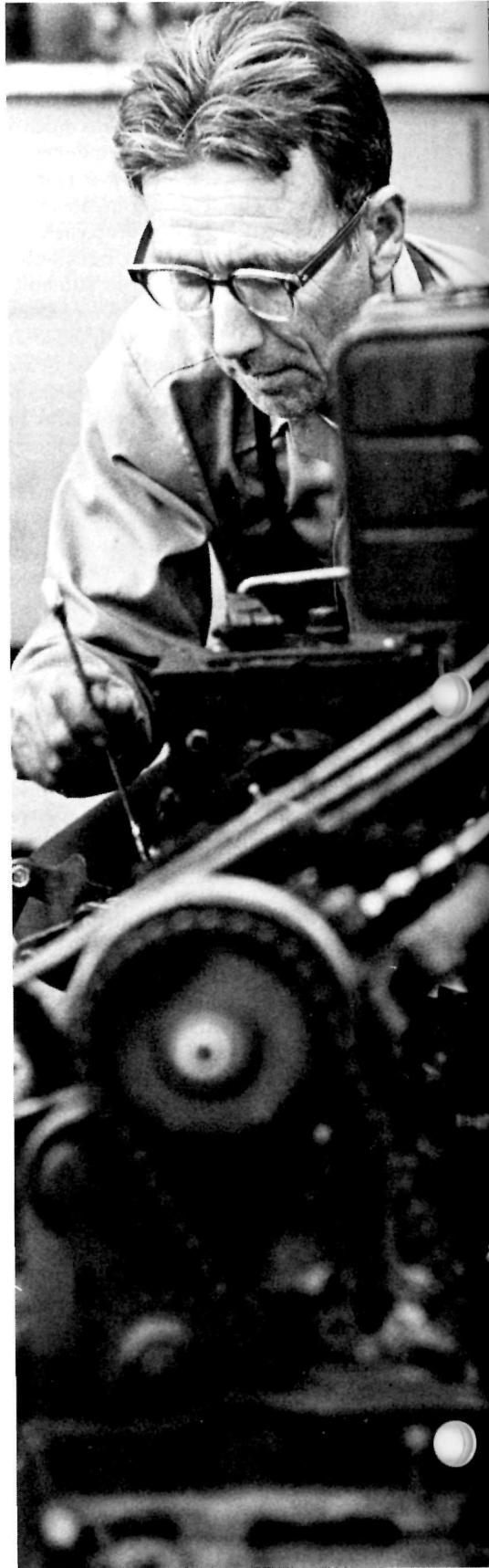
Maintenance management is a profession requiring the highest caliber of managerial talent. An area maintenance chief must not only be technically aware, but must also be capable of effectively managing maintenance programs that may total hundreds of thousands of dollars. He must be able to plan and implement an on-going regular maintenance program and a workable preventive maintenance program, as well as being able to quickly re-orient his crews, equipment, and funding to meet all types of emergencies. Frequently, there are also development (construction) programs and/or reserve funding programs which must be included in his planning and eventually in his operation.

In addition to his everyday program responsibilities, the chief of maintenance of an area makes and implements important decisions which affect the entire park. This is particularly true in the case of disaster situations—natural or budgetary. He is the one, ultimately, who must make a decision about whether a potentially unsafe bridge should be closed, or whether a road should be repaired or abandoned. More often than not, he must make such decisions quickly and without outside help.

As noted earlier, pollution abatement and energy conservation concerns have begun to bear heavily on maintenance operations everywhere. The advent of the National Environmental Policy Act and subsequent regulations, as well as the dawning realization that our national energy resources must now be conserved, make it increasingly important that park managers be knowledgeable about how to abate pollution and conserve energy. For this knowledge, they must be able to turn to their maintenance managers, since the maintenance organization is the most directly involved in both areas. Not only must pollution abatement facilities and devices be operated by maintenance personnel, they must frequently be planned and their construction supervised by the same personnel. Energy conservation is also a vital part of the maintenance operation. It is primarily a maintenance responsibility to see that energy is conserved in buildings through added insulation, tuning of cooling and heating equipment, etc., and conserved in vehicles through more thoughtful and appropriate uses.

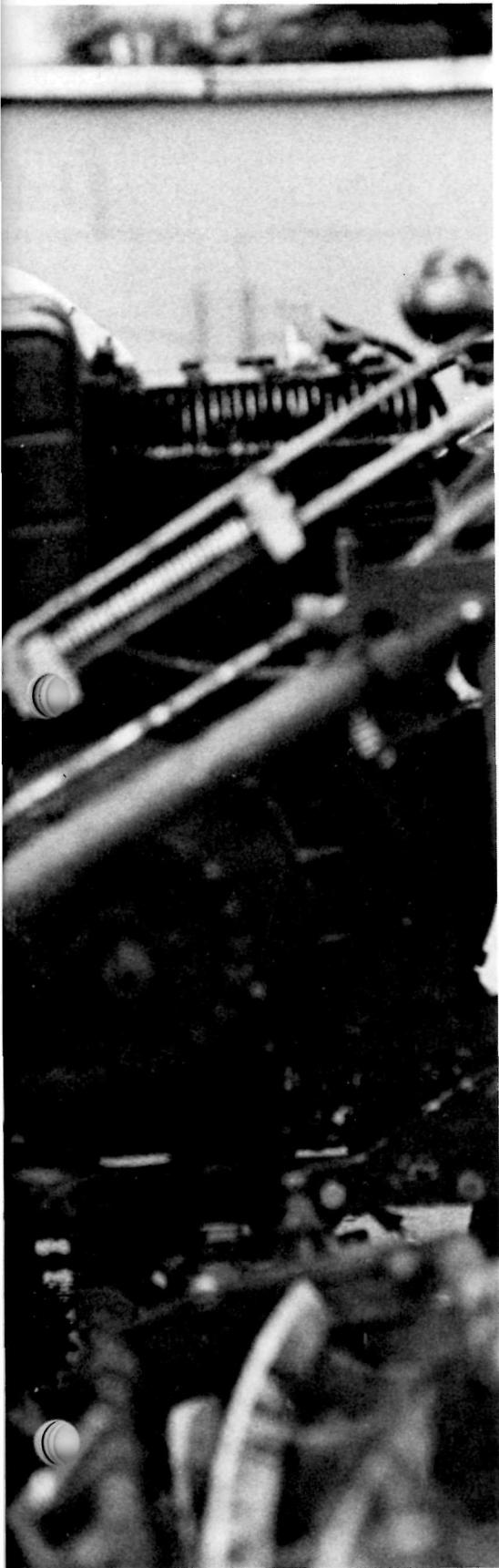
This special issue of *Trends* magazine is devoted to the field of maintenance to give our readers greater insights into the profession and the diverse problems and responsibilities of a maintenance worker and manager. Included in this issue are articles on preventive maintenance, maintenance planning, energy conservation, a career in maintenance, the impact of environmental, health and safety controls on park maintenance, a system of approaching highway maintenance, budget planning, and maintenance for historic preservation. Finally, we conclude the issue with a directory of associations and groups offering additional information and assistance in the field.

*Mr. Rowe is Chief, Division of Maintenance,
NPS, Washington, D.C.*



Maintenance As A Career

by Gary Everhardt



There is a popular misconception today that maintenance is a combination of unskilled and menial tasks performed by people who aren't qualified to find better jobs. The truth is, however, that most of those engaged in maintenance of park and recreation areas on a day-to-day basis are well trained and daily solve complex technical problems. Recent technical innovations in construction and upkeep of new and existing structures and facilities make the field a challenge to anyone. The job of a maintenance employee, particularly in a park or recreation area, can be as demanding and as creative as the worker and his manager want it to be.

From a park manager's point of view, he is aware that there has been a steady increase in total maintenance workload. This is largely due to the constantly increasing demands by users for higher levels of maintenance and the number of newly acquired facilities requiring maintenance.

The park manager is also aware of the rising costs of maintenance in the past 25 years. Labor forces now earn four and five times more than they did in 1950. Construction costs are out of sight, and the future outlook in terms of increased energy costs is grim. The total situation is complicated by the fact that maintenance needs are expected to grow by more than 60 percent in the next 10 years.

Recent laws and regulations, especially those concerning environmental controls and health and safety standards, create additional burdens for the park manager. Policies being formulated at the state, national and international levels substantially affect all management decisions.

Park managers are becoming increasingly aware that the fundamental approach to meeting these requirements is to improve the efficiency of maintenance operations. They also know that efficient operations depend more on effective utilization of human resources than on any other single factor.

This has created a situation in which more demands are put on those engaged in maintenance. New skills and ingenuity in solving problems are necessary, and the professionalism of those performing maintenance tasks becomes a key factor in the smooth management of a park or recreation site.

Today there are a number of exciting developments in the field of maintenance and maintenance management. Recent developments in mathematical programming using data processing equipment are calling for increasingly sophisticated skills. By using this new equipment, the manager is able to combine several program concepts to develop his budget. The computer has the ability to acquire, assimilate, analyze and disseminate large amounts of information with great speed and accuracy. The potential exists to combine performance standards which describe the procedures to be followed, the men, equipment and materials to be used, and the rate of production desired with mathematical models depicting the various elements of the system. Any automatic data processing system can draw tremendous quantities of information from its input files and include them in reports. It is up to the manager to determine the information that would be useful to him.

The concept of using computers to process maintenance needs is new and constantly changing, and offers an enormous potential for anyone wishing to enter the field of maintenance management.

In addition, maintenance managers today are being asked to assume greater responsibilities to keep up with the numerous technical changes. Knowledge of automatic controls which monitor the entire utility system of a large building complex, or monitoring the efficiency of a building heated and cooled by solar energy might well become important parts of future maintenance skills.

Recent achievements in alternative energy sources have opened the door to people with imagination and desire to contribute new ideas. For example, the National Park Service is constructing a large visitor center at Big Horn Canyon National Recreation Area using solar energy for heating and cooling. Solar powered comfort stations are being designed for several places in the Southwest and Rocky Mountain areas.

One of the most serious problems facing park and recreation managers is that of providing training for maintenance employees to continually upgrade the skills necessary to keep pace with technological developments. In the National Park Service, we are always on the lookout for training opportunities available through various manufacturers, particularly those offering hands-on training.

Learning maintenance skills in some fields requires on-the-job training. For example, someone who needs to know how to work in a wastewater treatment plant would get training at a plant with similar facilities. The individual would perform a variety of tasks under the close scrutiny of a trained operator—working as a plumber when making minor repairs; submitting reports relating to regulatory requirements; testing the influents into the plant and effluents being discharged. These tests require a knowledge of hydraulics, chemistry, and mathematics. There is no substitute for this kind of training.

The National Park Service has initiated a maintenance management intake program. By providing specific objectives and standards for recruitment and training for those entering the Service, more qualified individuals can be placed in maintenance management jobs. Training is a continual process for maintenance employees in the National Park Service.

One of the most disturbing factors in the maintenance field, at least to National Park Service managers, has been the misconception noted earlier that maintenance is not a recognized profession calling for highly specialized skills. Maintenance work has not had the same appeal to those just entering the work force as other jobs have had. Because maintenance is often thought of as a routine operation with duties sometime far from pleasant, it has been difficult to recruit qualified personnel for the numerous highly technical fields within a maintenance operation. Few young engineers, for example, realize the complexities involved in reconstruction of existing facilities or the knowledge of construction needed before reconstruction can begin.

There has been and will continue to be a need for highly qualified people to carry out maintenance tasks. Trained engineers and maintenance technicians are needed

to operate and manage numerous kinds of facilities throughout the Service. Opportunities are almost unlimited for anybody in the maintenance field to increase his knowledge and obtain better positions. Demonstrating initiative and a willingness to tackle the hard jobs with increasing responsibilities are proven ways to get ahead.

From my own experience, I have seen that maintenance work is a real challenge. There's no doubt in my mind that this is where the action begins—and it can be one of the most satisfying and rewarding professions available to young people today.

Mr. Everhardt is Director of the National Park Service.





Energy Conservation in the Park

by Eugene P. Krug

The national energy situation is forcing us to take a new look at our energy utilization, and to develop park energy management programs—similar to those of large industry and commercial building users.

To get a better perspective of how energy concerns are changing and how fast, consider briefly that energy consumption in the United States doubled between 1950 and 1970. Our national energy appetite is growing at about four percent to five percent per year and will, at this rate, double in 15 years. By the year 2000, we will need four times as much energy as in 1970 (which was twice as much as 1950) and by 2030 almost 16 times our 1970 usage. By that time, there just won't be enough oil or natural gas left in the ground to go around—if there is any at all. As we have all seen, energy prices have skyrocketed; and as we realize how limited our resources are, they will increase even more. So conservation has become an absolute necessity.

It is within this context that we in park management and operation must consider our approach to the energy problem. First, we want to be able to utilize the least amount of energy practicable, most efficiently, to ensure the highest practical degree of immunization from potential energy shortages and fuel price increases. While this may be a mouthful, it must be recognized that either of these two occurrences (shortfalls or price increases) would have the effect of causing a cut-back in park operations and services to the visitor.

Second, the case can certainly be made for any park serving as an example to the visiting public of energy conservation. This additional role of educating the public on the need for conserving energy is necessarily intertwined with interpretation. Although it might require some imagination, the energy conservation message can be woven into existing interpretive approaches at many, if not all parks. The National Recreation and Park Association has been awarded a contract by the Federal Energy Administration to develop such interpretive presentations at selected local, regional and national parks. These will be soon available for dissemination to and adaptation by all parks.

As an ancillary to interpretation, demonstration of energy conservation and of the future role of alternative technology in our lives can help get the message across to the visitor. The most obvious method of demonstration would be to actually incorporate visible programs into the park setting—such as solar heating and cooling of buildings; wind generation; and electric vehicle patrols. More will be said about these later.

There is perhaps one more factor that ought to be brought out regarding park energy conservation programs. As the public becomes more sophisticated and knowledgeable about the need for energy conservation, it will also become more critical of the way its government's institutions manage energy. And parks by their very nature are fundamentally conservation organizations. Clearly, increasing public awareness of the energy problem and conservation of energy can be justifiably expected by the public as an extension of a park's conservationist role.

Summing up, the role energy conservation will be playing in parks is an obvious one that will be expanding as the economic and institutional forces that affect energy impinge on the daily workings of every park.

The Park Energy Management Program

Instituting an energy management program can really make a difference. The National Park Service experience shows that conservation measures can reduce energy utilization by 15 to 30 percent or more, with the attendant financial savings. It is estimated that energy costs for FY 1975 would have been at least \$1.5 million more if we had not instituted an effective energy management program. Now, even in a park that uses about \$1,000 worth of energy per year, several hundred dollars can be saved by conscientious effort.

In developing a carefully planned energy conservation program, it is important to consider each of the points listed below:

1. A strong commitment by the park manager is absolutely essential. If the park manager is not really committed, he might

not see the value of investing initially—whether it be employee time; equipment; insulation; or whatever—so that a return of savings in energy costs over a period of time might be realized. At this time, the average person is not overly concerned with energy conservation, and unless there is a vigorous impetus from up top, the danger exists that a well-conceived program could be reduced to empty motions and inaction.

2. There should be an overall coordinator for the park energy program. This person should also have some authority in policy and decision making with respect to energy matters. Such status means that he can take action without wasteful delay when necessary.

There are many state, county and municipal park systems that might warrant having a systemwide or central office energy coordinator. In the smallest of parks, the coordinator might be the park manager himself. In larger parks, someone with some engineering or technical expertise and with good coordinating capabilities—a Chief of Maintenance or park engineer—would be a good selection. To get the broadest possible input into the program a committee, comprising representatives of several divisions within the park infrastructure could serve to coordinate such activities.

3. Develop a set of goals and objectives. "Management by Objectives" is becoming a very popular approach to all forms of management. Set goals to strive for at the park and throughout the system: e.g. a 15 percent reduction (or whatever) in consumption, a plan to educate employees to the energy situation and your individual program, institution of an energy interpretive display or program, etc.

4. Institute an Energy Reporting System. The rationale for such a system must be well understood so that those involved do not become disenchanted with the energy conservation program. The report tells you where your energy dollars go and at what times during the year—all electric and fuel bills are totaled according to energy type and period covered. This profile, done periodically, is a yardstick of the success or failure of your program.

Another valuable exercise is to compare current consumption to that of a base year period—perhaps the previous year's same month or quarter, allowing for some adjustments for program modification.

5. Plan and implement an energy survey. An energy survey is basically a systematic inspection of buildings, utilities and operations. It is the best means of determining the physical condition of all your buildings and equipment. Once this is accomplished, and the condition of buildings as well as efficiencies of mechanical equipment is determined, the park manager will have a good handle on what steps he can take to eliminate energy waste. It should be obvious that those conducting the survey should be familiar with the operations and maintenance of those facilities surveyed. The basic areas for consideration should be:

- a. heating and air conditioning systems.
- b. physical structures—for insulation, weatherstripping, caulking, storm windows, entry vestibules, etc.
- c. lighting, both indoors and out.
- d. general park operations—for opportunities to conserve energy.

The following checklist, found in the U.S. Navy Conservation Handbook is a good example of what should be included:

Buildings

Building description

1. Location
 2. Environmental Orientation
 3. Size (sq. ft., stories)
 4. Type of Construction and Materials
- Type of Heating Ventilating and Air Conditioning System
1. Windows
 - a. Storm Windows
 - b. Caulking
 - c. Weatherstripping
 2. Insulation—Type and amount existant—additional amount required
 - a. Ceilings and roof
 - b. Walls
 - c. Floors above unheated spaces

Interior Ceiling Openings

1. Attic Doors—Weatherstripping, Caulking
 2. Light Fixtures—Caulking
 3. Vents—Caulking
- Controls—Thermostats, etc.
- High use entry doors—airlock

Mechanical Equipment

Water Heaters

1. Type
2. Setting
3. Condition of Burner/Electrode

Action Required

Heating System

1. Type—fuel and distribution
 2. Radiators and baseboards—control valves
3. Duct work—condition of registers—tape or insulation required

Piping—insulation

Overall Condition

1. Plumbing System
2. Heating Plant
3. Action Required.

Energy Conservation Opportunities

Operations

This is the program phase where the proper utilization of energy survey findings can begin to make a dent in your park's energy consumption.

This is when teamwork and the overall cooperation of all your employees will pay off tangibly. So much of the battle against energy waste concerns overcoming attitudes. You might want to try to speed this process along by initiating a campaign for energy conservation among park employees. An energy incentive award program for actions or suggestions to save energy might generate the cooperative spirit needed.

Major reductions can be realized by a variety of approaches in all park operations. In park buildings, placing strict controls on heating and cooling temperatures is one of the single most important "do's" of energy conservation. For every degree lower the thermostat is set in the winter, a three percent savings in energy can be realized. So dropping the thermostat from 74 degrees to 68 degrees can be an 18 percent reduction in consumption, *with no capital investment!* Probably the two best capital investments you can make are to add insulation and storm windows. A recent National Bureau of Standards study found that adding storm windows to an existing house saved more energy than any other single factor, about 30-40 percent, since windows are the greatest source of heat loss. This does not imply that insulation should take a back



seat. Indeed, judicious selection of insulation thicknesses for walls, ceilings, and floors, can often pay for themselves in several years in lower heating and cooling costs. Substituting fluorescent lighting for incandescent (more lumens per watt), employing skylights for natural light, and using reflective paint for better utilization of available light, are just a few more possibilities for saving energy. The list goes on as far as your imagination will allow.

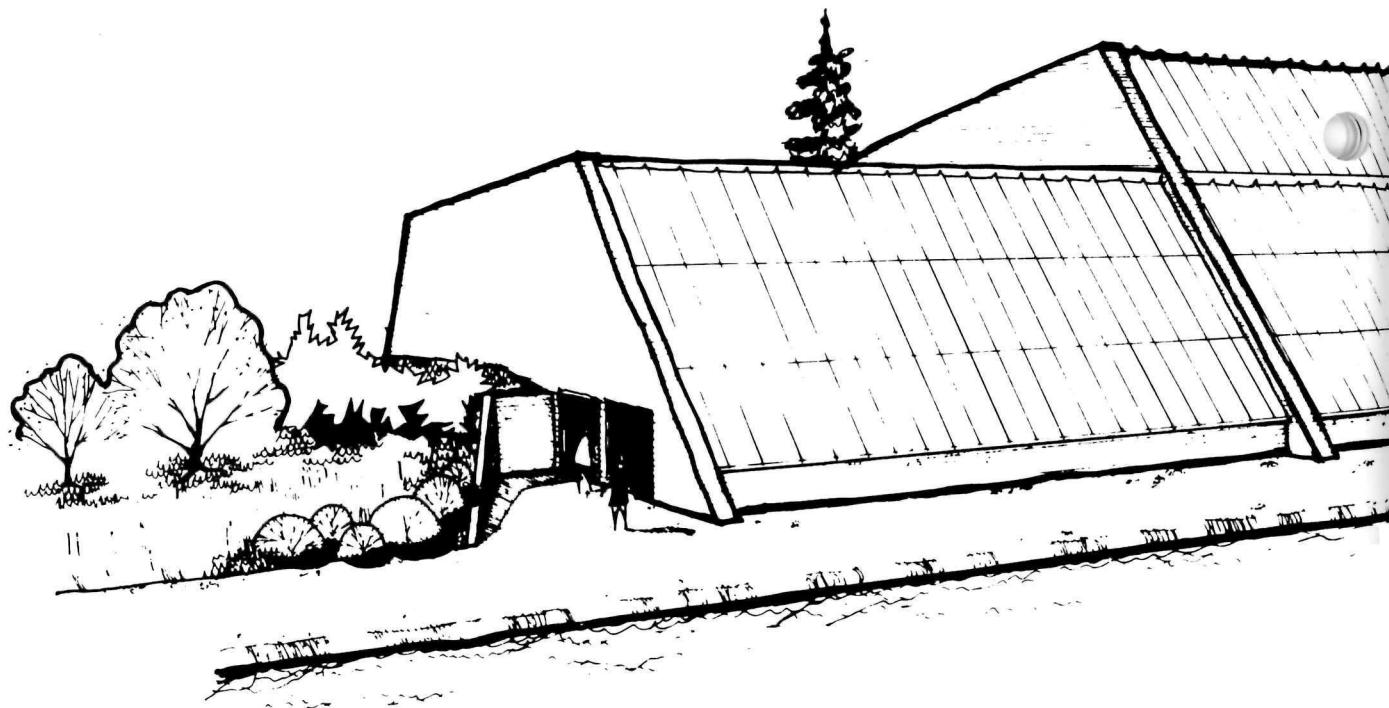
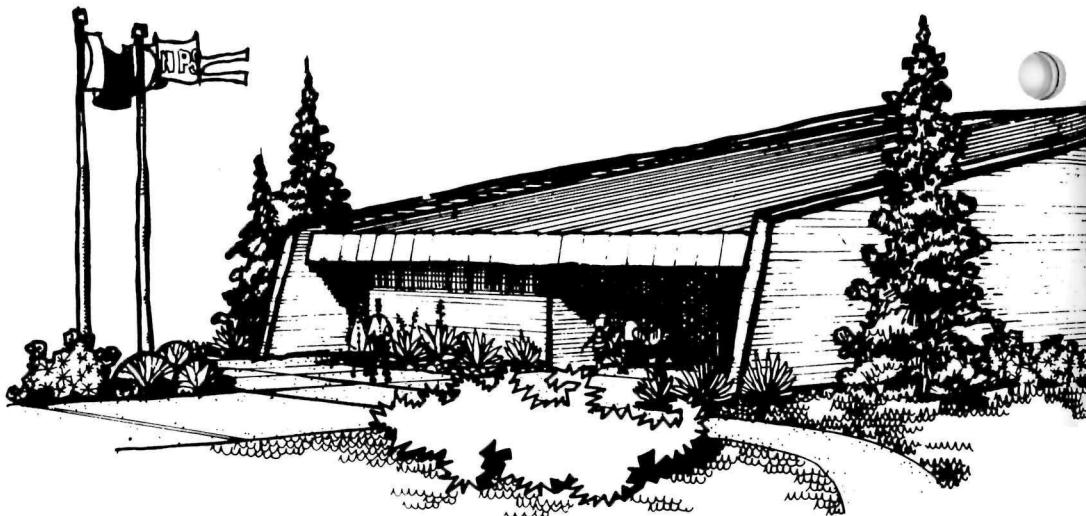
Vehicles consume and waste a great deal of energy. For example, approximately 20 to 25 percent of all National Park Service energy use is through vehicles. Energy and economy wise, we're obligated to replace the larger, existing ve-

hicles with compacts and subcompacts when replacement time comes around.

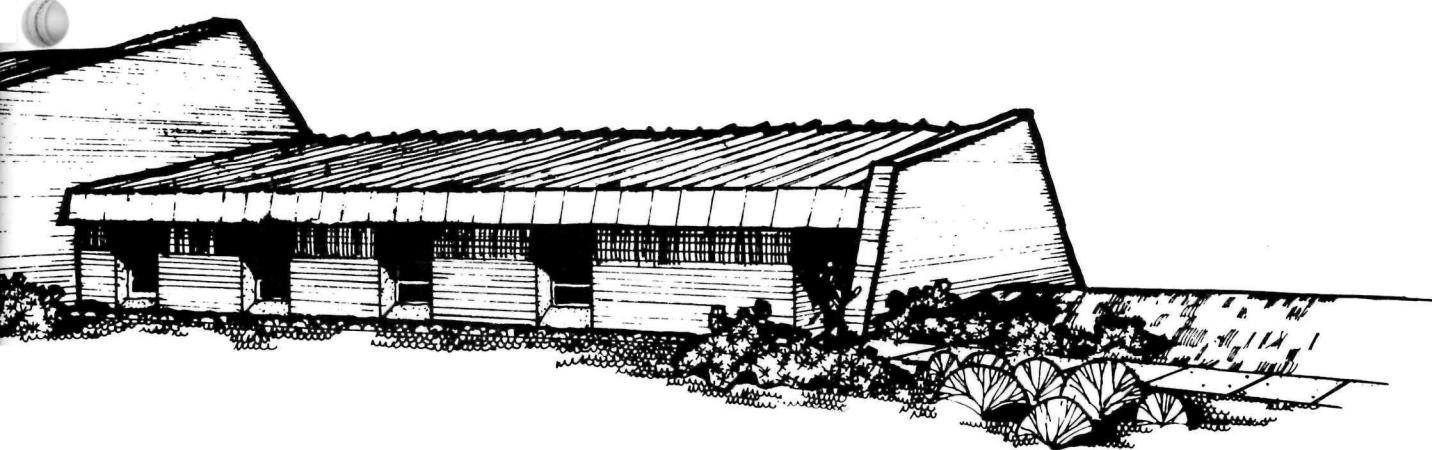
Electric vehicles are beginning to dot National Park Service vehicle inventories, especially in the Washington, D.C. area, where they are being used extensively for routine maintenance and ranger patrol. Operating costs for small electric vehicles are minimal. Most electrics have an operating range of 5 to 8 hours, and require at least an overnight recharging. In fact, with any electric, it would be wise to carry an extension cord, and never pass up the opportunity to plug into an electric supply when the vehicle is idle. The achilles heel of the electrics is the battery. Since the electric vehicle is so trouble free, it can invite neglect, which basi-

cally means allowing the water level to get too low. Scheduled inspections of the batteries are necessary, as is the use of de-ionized water. For more details on the use of electric vehicles in parks, contact the National Capital Parks division of the National Park Service in Washington, D.C.

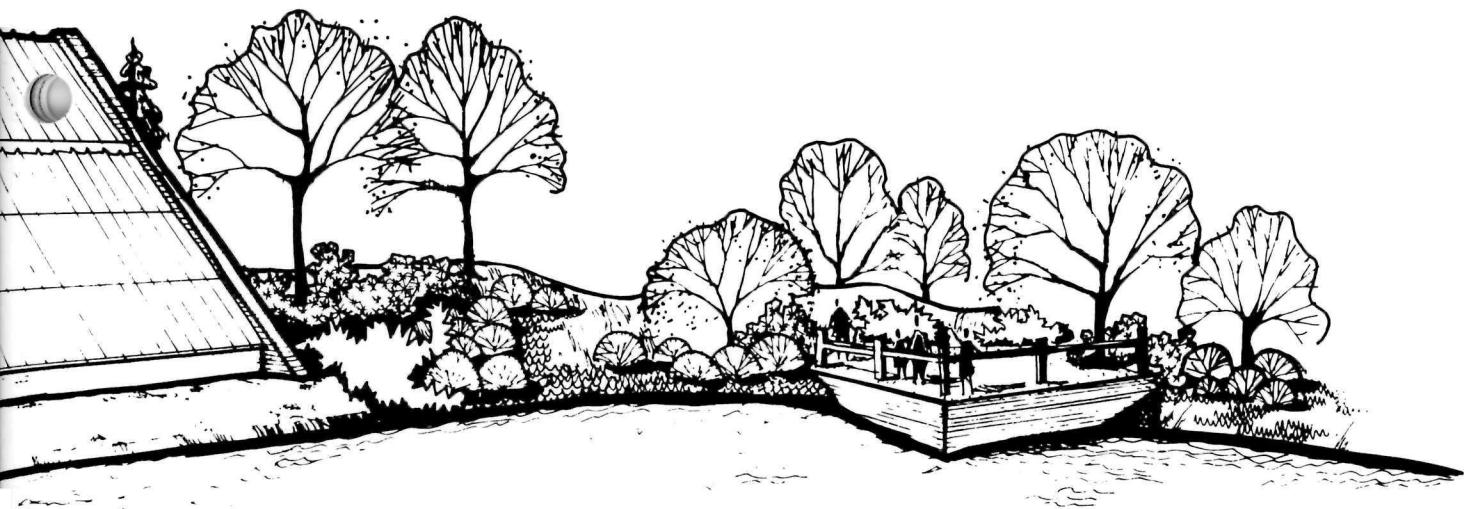
In lieu of electrics, you can still save a lot of money and energy by using smaller Cushman-type vehicles, motor scooters, and even bicycles. Look into using these for light maintenance, litter pickup, and short in-park commuting.



Project Number 1320-5451 **Lovell, Wyoming**
BIGHORN CANYON NATIONAL RECREATION AREA



Northwest View



Southwest View

Lovell Visitor Center

Whether or not you have an efficient mix of vehicles, it is crucial to match the proper size vehicle to the job required. For example, one does not dispatch a large truck or pickup for a task which does not require a payload carrying ability. Conversely, one crew-cab pickup or van might be more efficient for transporting a six man work crew to a site rather than two or three separate vehicles.

Look at your mechanical equipment—is it overpowered for the tasks it performs? You might have a ten horsepower pump in a well when a five horsepower pump would suffice to supply all the water that you need. Not only does that waste energy directly, but it causes the larger pump (or whatever piece of equipment you're dealing with) to operate at a low efficiency rate. Find out how many pumps, boilers, sewage treatment systems, etc., are improperly sized for your purposes and try to replace them with more efficient units, if possible.

There are a host of other projects that you might want to consider as energy saving alternatives. These include bicycle trails, back-country trails, and alternate public transportation around larger parks—all to encourage energy conservation among visitors (and to protect the environment); gravity set water and sewer lines where possible to reduce electricity usage; walking roadside and campground pickup for maintenance crews, where possible; deposits on beverage containers to reduce litter and subsequent energy expenditures for cleanup; and reduced acreage requiring mowing, being careful to retain it when fire control, drainage and just plain good looks demand it.

Planning

In order for energy conservation to become something more than just a stopgap measure, it must be given due consideration in general park planning. The energy requirements of any facility should be considered in the planning and design of that facility. The technical aspects such as adequate insulation, proper siting of the building, adequate heating, cooling and lighting systems, must be carefully considered by architects, engineers and maintenance specialists to insure lower fuel and utility bills. The same planning should be applied to all equipment



purchases so that you are never faced with the decision whether to replace an oversized pump or air conditioner. In general park planning, park access and circulation modes should be designed for maximum efficiency. Headquarters, maintenance shops and visitor centers should be sited to minimize energy waste by reducing unnecessary travel for both park visitors and employees.

Budget

One of the most important pieces of planning in the park is the budget. Energy conservation expenditures should be listed as a separate line item to show the associated savings. The idea of a payback period from these savings is crucial to any intelligent decisions requiring additional expenditures. For example, a certain building designed for energy conservation might cost more initially than the alternative, yet over a period of so many years, (payback period) the accumulated savings in energy costs will more than make up for the extra initial capital investment. The same reasoning would hold true for mechanical equipment. Life-cycle costing is the name generally applied to this method of expenditure evaluation, and is the most accurate means of determining the relative merits of most capital expenditures. The Department of Defense, by the way, is utilizing this approach and has set a 10-year payback period as their criterion for whether to invest in energy conserving improvements.

One final but important aspect of energy planning involves the unique ability of a park to relate a message to the public. This can play a central role in the park's conservation program.

Energy Alternatives for the Future

Energy alternatives lessen reliance on fossil fuels. Many of these alternatives would serve to bring parks closer to a "naturally" self-sufficient state, dependent only on the environment for energy input. It may only be a dream, but it might also be a very worthwhile one to pursue. Parks can function as the leading edge of the energy wave of the future simply because of their inherent ability to serve as a model and interpretive tool for the public.

The alternatives for energy sources are being explored in some depth, particularly uses of solar energy for heating and cooling and electricity generation.

Wind energy is making a strong comeback from the days of the windmill. Geothermal energy is producing electric power in California right now and heating a college campus in Oregon. New and innovative means of handling wastes are changing the energy intensive and ecologically damaging aspects of these processes. For example, sewage sludge may be a valuable substitute for petroleum based fertilizers.

Parks, serving as a contact point with the public, can play an important role in the drive towards energy conservation. We can educate the public while we educate ourselves. Just as our personal lives and lifestyles can be affected by the continuing energy shortage, so will the "lives" of all our parks.

Mr. Krug is a Mechanical Engineer (Energy Conservation) with the Maintenance Division, NPS, Washington, D.C.

Planning for Maintenance Management

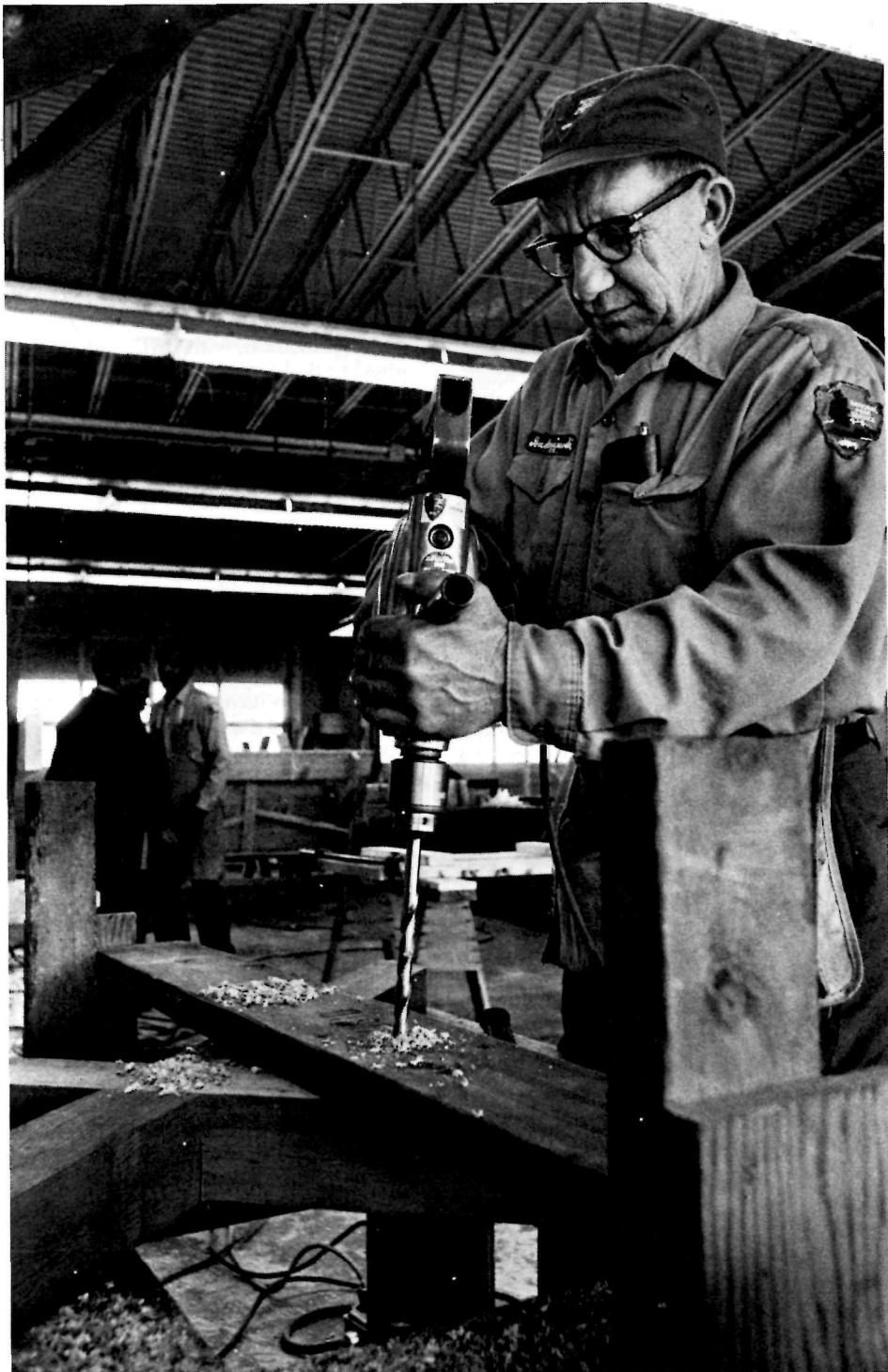
by Robert D. Espeseth

Good management is the key to success in the operation of a park and recreation agency. There are, of course, many facets to the broad term—management. We speak of personnel management, fiscal management, program management, resource management or maintenance management. The latter element, maintenance management, is an often overlooked or underestimated function in comparison to land acquisition, design and construction, general programming, and other more "glamorous" areas of a park and recreation organization.

The task of managing a maintenance operation requires a great deal of thought, judgment and understanding if the agency goals and objectives are to be met. The maintenance manager (supervisor) must be able to organize, schedule, budget and evaluate maintenance operations in meeting these goals. He must be a long-range planner and a short-range producer. He must be able to deal with people internally and externally.

The users of park facilities generally are not concerned about maintenance problems. Their main concern is that a facility is available and in good condition when they decide to use it. Is this unreasonable? Not really; these are the people who are paying for the facilities and their maintenance. If there are unusual numbers of public complaints, it is time to evaluate maintenance procedures and re-order the priority given to maintenance in the budget and the organizational structure.

No facility or program, whether it is a public park and recreation agency, or a related structure, can expand in size or service without taking into consideration the additional burden imposed on the maintenance forces.



In a new organization, land acquisition usually starts first, accelerates rapidly, peaks out and ultimately declines. The development phase follows at a slower rate, peaks out at a potentially higher level sometime after land acquisition and at some point also declines. Programs usually follow both acquisition and development in the rise cycle, level off and may continue at a slight rise as a near-maximum use of facilities is achieved. Then comes maintenance which continues to grow at an increasing rate as more land is acquired, more facilities developed, more programs instituted, and goals for higher maintenance levels are set. Where does it stop? That's a key question which must be addressed in long-range maintenance planning. In most mature, comprehensive systems maintenance will become at some point the largest budgetary item which top management must be prepared to recognize. It is incumbent upon all levels of management to be as cost conscious and efficiency oriented as possible in all areas of operation as this budgetary peak is reached.

It is for this reason that I would strongly advocate including maintenance personnel on all operations and program task forces, master planning teams and project development groups. If facilities are to be well maintained at a reasonable cost they must be carefully designed and wisely planned. Constructive suggestions by maintenance management during the program development stage of a project, with continual review during the planning and design phase, will result in more efficient maintenance and lower costs. It is "pennywise and pound foolish" to disregard the latest technological advances, to disregard the use of durable and lasting materials in design and construction, or to neglect to consider good maintenance procedures at the earliest possible stage. If construction costs must be cut, be careful where the cuts are made; frills can often be added more easily at a later date than solid basics needed for good maintenance.

In spite of the best advanced planning, maintenance problems will arise which can be solved only through the exercise of good management and ingenuity. There are very few, if any, maintenance free areas and facilities. Therefore, the direct relationship between the initial cost and the anticipated maintenance requirements should be carefully analyzed. Significant savings in labor costs can be achieved through attention to apparently minor details in the design and construction phase—details which will only be recognized and brought out by maintenance personnel who are familiar with these procedures and techniques. Construction costs occur but once; maintenance goes on for the life of the facility!

Any meaningful maintenance program recognizes two general types of maintenance: continuing and periodic. Some would say preventive maintenance would be another type, but I feel it should be part of continuing maintenance for obvious reasons. From the managerial point of view, park maintenance claims a major portion of the park staff, and few areas of park operations offer as broad a spectrum of divergent operations. It is incumbent upon the maintenance manager to organize his employees and equipment efficiently and flexibly to meet continuing maintenance needs, take care of periodic items and meet emergencies. Through a well planned and effectively scheduled work force, the limited budgets almost everyone faces can be utilized most beneficially in striving to meet the goals of the organization.

Productivity of 100 percent is an almost impossible goal; however, it is possible to reduce the unproductive time considerably through good supervision, better planning and scheduling, work simplification and better work analysis techniques. Motivation is often the difference between a lively, productive park operation and one that is dead on its feet. However, motivation of personnel must be recognized as one of the most difficult and challenging tasks of management.

Maintaining a Good Image

Presenting a good public image is something every park and recreation agency strives to do. There are many aspects of an agency's program which may be easier to sell to the mass media than maintenance, such as new programs and activities, new

facilities, and even new administrative innovations. However, the average user is quick to register complaints when equipment is broken and raise eyebrows when toilets are dirty or lawns are not mowed. Good maintenance of itself may not be very glamorous, but poor maintenance is disastrous in achieving and sustaining a good public image.

Good public relations must be carried out not only by upper echelon personnel but must permeate down through an entire organization, with particular attention given to the maintenance and operational force. These are the people who probably have more face-to-face contact with the general public than any other group in your organization. The appearance of maintenance employees (haircuts, uniforms, habits, etc.), appearance of trucks and equipment (cleanliness, paint, repair, etc.) and the speaking and communicating ability of these personnel can have a significant effect on the overall public relations program. It pays dividends to train employees to have at least a working knowledge of the organization and programs and be able to transmit this information intelligently to the public when it is requested. It is very frustrating for a taxpaying citizen to receive a "flakey" answer or no answer at all from someone who works for a public agency.

Good public relations is made up of the contacts, impressions and attitudes that constitute the relationship between the park and recreation agency, its employees and the public. The measuring stick of good will is public opinion, and public opinion is powerful. Good public relations is one activity which costs very little and yet pays the biggest dividends in good will. It can be developed in a responsive training program.

The level of maintenance will vary within a park system depending upon the type and intensity of use. However, each park area and facility must have predetermined standards so that the character and adequacy of maintenance can be measured. Both the manager and the public will use their particular standards to determine if a facility measures up to their expectations. The excellence of the entire operation may well be determined on the basis of maintenance.

A properly developed and continuous training program for maintenance personnel is a necessity. It is a primary responsibility of good management. Personnel need to know what is expected of them, how to do the job properly, what is available to help them do their job better, how they fit into the organization and how they can advance themselves.

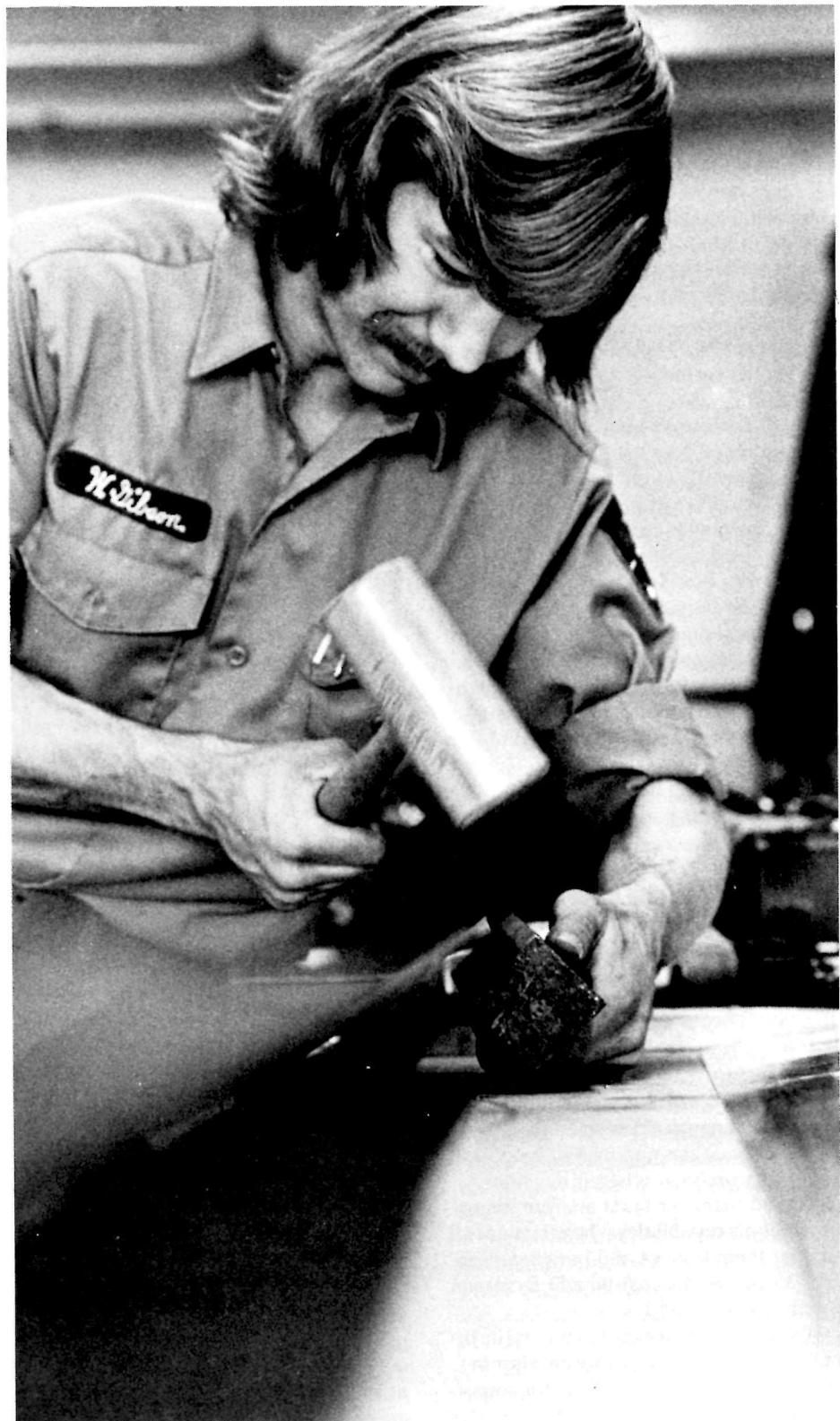
The maintenance field in parks and recreation is undergoing dramatic changes as research and automation introduce new innovations and techniques.

Maintenance management demands employees who possess both technical knowledge and a variety of skills to keep these more sophisticated operations functioning smoothly. Maintenance personnel must be alert and have education and training consistent with the level of work expected. First-rate maintenance can only be achieved by first-rate personnel.

In addition to the training you can accomplish "in-house", take advantage of the myriad of educational opportunities others can offer. Many educational institutions offer courses which can be utilized by maintenance employees. Manufacturers are expanding their training capabilities and services to the point where the sale of complicated machinery or systems includes the training of personnel in operations and servicing. Keep abreast of new training opportunities.

Major changes will have to be instituted in our methods of operating and maintaining recreation areas and facilities. We undoubtedly will have to go to greater degrees of use control and higher maintenance levels as population and use pressures increase. We will have to do a great deal more with management analysis so we can more efficiently use our limited resources. We will have to use more sophisticated management tools in scheduling and planning maintenance activities so we can predict and heed the warnings before over-use threatens physical facilities and environmental deterioration.

We must be aware of management responsibilities in preparing and planning for the maintenance involved with the recreational loads of the future.



Mr. Espeseth is an Outdoor Recreation Specialist at the University of Illinois at Urbana-Champaign.

Preventive Maintenance

Preventive maintenance is an area which is often difficult to pin down in a budget. Regular inspections, cleaning and testing of equipment is part of any quality maintenance program. A good preventive maintenance program should provide for planned shutdowns of equipment to allow for correction of borderline problems that could ultimately result in major breakdowns.

It is crucial to program time for major overhauls. Preventive maintenance cannot be squeezed in when someone remembers or has a spare moment. It must be a regular part of any good maintenance program.

There is a delicate balance which must be maintained between too frequent inspections which waste man-hours and money, and too few inspections which do not catch potential problems before they occur.

A priority list of equipment should determine the preventive maintenance inspection schedule. Clearly, those pieces of equipment or controls which could force the shutdown of a major facility are highest on the list. Inspections can be visual or working but may require a total shutdown of equipment.

Good records and a ready supply of critical replacement parts for the equipment are necessary for a good program. It is the responsibility of the facilities manager to evaluate or determine the degree to which preventive maintenance is included in his overall maintenance management program. Often, a manager will lose sight of economic values when he develops a no-breakdown operation as a matter of pride rather than one of necessity. There are managers who may falsely consider good preventive maintenance a waste of money and prefer to have large crews of specialists and materials on hand to get to a problem when it develops.

A good manager must analyze his organization's capabilities—how fast does it take for them to react and handle a problem? What are the cost-benefit factors in any given approach?

While preventive maintenance is the investment required to insure maximum and efficient use of a facility, it is important to remember that maintaining a piece of worn out equipment which should be replaced or overhauled is not effective.



A quality preventive maintenance program begins with an inventory of a facility or a piece of equipment. We need to look at the age of the equipment or facility, potential weaknesses, and items that will contribute to reduced life. A program must be developed in response to the inventory evaluation and should be updated periodically.

A well-coordinated preventive maintenance program can save a park or recreation area thousands of dollars and hundreds of man-hours in emergency repair time.

The Maintenance Service Center

by James W. Taylor

Mr. Taylor's article was prepared for the Park and Recreation Management School at North Carolina State University.

New or expanding park maintenance departments often have limited knowledge of the needs or the available maintenance equipment to fulfill the requirements of their park. At the same time, well-established or operating departments have full knowledge of needs, but require outside support or documentation for planning and purchase recommendations to their governing authorities.

Most assuredly, the experienced administrator knows the local use habits, the demanded levels of service and the financial limitations of his locale. He has already been required to exercise a high level of ingenuity, skill, and sometimes politics to satisfy the department's need. He may have been required to resort to horse-trading among governmental agencies or to a plagiarization of other functional park recreation departments for ideas, services or materials.

When and if he succeeds in acquiring the equipment and manpower—he is immediately faced with a need for active housing, seasonal storage, and sites for both routine and specialized maintenance projects. The park shop, the central garage, tool shed, barn, or maintenance service center, whatever it is called, is a key to a satisfactory plateau of maintenance.

There must be an evaluation to determine both the scope and the type of maintenance facility to be provided, that is, central, district or individual site center. At the same time, evaluations must be made with respect to site, location, structural design, functional and esthetic considerations, the trades and services to be accommodated, the utility or practicality of outdoor work and storage spaces, inventory control, security, and the storage of materials and supplies.

Common judgment of necessity must play a major role in the evaluation process. Input for the planning process incorporates an awareness and evaluation of the amounts and types of work to be performed both by hand or by machine. A thorough analysis should be made of the existing equipment, available storage, and needs projected for future machinery and manpower requirements.

The local governmental policy, the established practices of the department, the

available manpower, local or legislative restrictions, or sheer expedience will dictate the degree and scope of maintenance operations that may be considered or undertaken locally—which materially affects the size and scope of operation for a maintenance center.

Some categories of construction or maintenance operations could conceivably be handled by contract, such as: plumbing, electrical and heating installations; roof repairs; cement work; fences or back-stop construction; flagpole or sign painting; building design and construction; and, even tree pruning and removals. Storage, work, and active garage space needs can be further modified if specialized types of equipment should be rented—such as power trenchers, bulldozers, tree movers, graders, earth movers, trailers, heavy or light duty cranes, etc.

Other types of maintenance repair services may be handled through contract or outside sources such as tire service; major vehicle overhaul or repair, including collision and body work; saw sharpening; lubrication of vehicles; and small engine maintenance.

Other municipal or county agencies and departments may be called upon to cooperate on such items as blacktopping, snow removal, emergency work during windstorms, garbage removal and weed and pest control.

However, it would be impractical as well as uneconomical to operate totally by phone, or private contract, or to rely solely upon other agencies to perform routine work at their convenience. No legitimate department could function properly if it becomes nothing more than a phone booth maintenance broker. It is essential to have a separate maintenance facility, even if it is limited to a mere shed or tool crib—lest the department suffer extreme morale degradation which would then be reflected in decreased maintenance standards.

It would be a waste of time to attempt justification of a maintenance facility to keep machines, structures and manpower operational. It is important, however, to emphasize the savings in time and in headaches that may be eliminated by functional planning of a maintenance area. Inherently, and by human nature, maintenance facilities are planned with the best of intentions, but all too soon working

individuals become so involved in its use that the facility becomes inefficient, obsolete or depreciates due to lack of internal housekeeping.

The final performance of the maintenance service center, shop, or barn, is predicated upon arrangement, equipment, the variety of jobs to be done, the department's internal maintenance schedule, the individual ability of the personnel assigned to the facility, and the actual layout in view of the intended purpose. The adequacy or inadequacy of a facility may be answered in part by a determination of the time needed to assemble tools and materials to perform a given maintenance or construction project.

An appraisal must be made of the condition of the tools, as well as the general appearance and condition of the facility, to encourage expedience of work and develop pride in the performance of a maintenance task. There must be an awareness of hazards such as fire, dust, etc. that may influence the worker's attitude towards a completion of a project.

Questions will develop regarding planning of the physical features for a functional service facility. Decisions will need to be reached as to the scope of service to be provided by the center, and whether it shall function as: (a) central or headquarters service center; (b) a district or satellite maintenance service center; or (c) an individual, specialized, or local site service center.

In any instance, location shall be critically affected by available electrical service, water and sewage connections, fire hazards, convenience to public roads and transportation, drainage, potential for future expansion, etc. It should be located convenient to other service facilities and near major roads. There should be easy access to and from all weather roads and convenient to machine or outside storage areas.

Some interior spaces may need to be devoted to functions such as carpentry, plumbing, electrical welding, spray painting, and sign construction or repair. Each of these trades rely heavily upon electrical service. The abundance of motors and machines requiring 3- to 5-horsepower capacity mandates investigation into and provisions for 3-phase power. A single

metering service should result in substantial savings. Three-phase motor operation results in two economies; electrical consumption and the initial cost of motors. A single-phase 5-horsepower motor will cost roughly double that of a similar size 3-phase motor. Savings generally result in differences in the rate structure from the power supplier.

Other considerations must be given protection against fire. If welding is to be a function within the center, fire-resistant or retardant walls and roofs are recommended. One hundred-fifty feet of separation is recommended if there is to be adequate security from ignition of inflammables through radiation. In a majority of instances, this amount of space is impractical. Precautionary measures must then be planned in other ways.

The overall appearance of the center affects both the workmen and the visiting public. If it is necessary to include in the shop area construction, accommodations for specialized services such as police, rangers, fire control, staff, or a residence for security, special attention should be given the esthetics of the structure and service arrangement.

Solar orientation and awareness of the prevailing winds must be considered. Generally speaking, large openings or doors are best placed on the southern exposure of the building. It has been further determined that a two-foot roof overhang provides protection from summer heat without loss of benefit of the winter sun. Drive-through arrangements lose the advantages of solar or wind orientation; however, convenience and cross ventilation might be an offsetting factor.

The shape of the structure is extremely important in terms of its functional use and economics of construction. It is far easier to reach a good arrangement if the structure has a 1-1/2 to 1 or a 2 to 1 length to width ratio than with a square or relatively narrow structure. A 1-1/2 to 1 ratio is considered near ideal for most small situations. The overall size must of necessity vary greatly with its intended function.

Basically, a 24' × 36' facility is the minimum size for a small park and recreation facility maintenance program. This, however, is based upon the assumption that the structure would have minimum needs for inside work areas—for welding equipment, radial arm or band saws, joiners, work benches with vises, hand tool storage panels, supply storage, portable electrical tools, or portable service benches. Considerable additional space would be required and could be used advantageously if any or all of the aforementioned equipment were to be required. The size, shape and final arrangement of the facility could better be determined by a progressive planning process including utilization of scale cutouts of the equipment and machinery needed for the center.

Generally speaking, it is recommended that window areas equal 15 to 20 percent of the floor area. Some of this area could be substituted by transparent ceiling panels if provisions have been made for ventilation. An efficient exhaust fan and individual machine lighting could be a wise investment and reduce the total amount of outside window space requirements if vandalism is a problem. Ventilation becomes essential if welders, spray painters, or motor vehicles are to be operated within the structure.

The American Society of Heating and Air Conditioning Engineers, Inc. recommends that a fan provided be capable of moving one cubic foot of air per minute for each square foot of floor space. In areas in the south requiring comfort cooling, they further recommend a fan with the capacity to move the air each minute. In areas where heat must be provided, they recommend ceiling heaters with blowers to eliminate the sacrifice of valuable floor space. Portable radiant quartz heaters may be used for supplemental heating at individual work benches.

If extensive work is to be performed indoors, lighting engineers recommend 20 foot-candles for general lighting with up to 50 foot-candles for delicate or detailed bench area repair work. Generally, this requires supplemental light fixtures in critical work areas. General illumination or lighting fixtures are effective when placed 10 to 12 feet above floor level. Efficiency of work-bench lighting is reduced if the fixtures are in excess of five feet





above the work surface. Supplemental portable fixtures may be desirable in many situations.

The emphasis on public liability and workmen's compensation demands that employee safety be given a first consideration in the planning of any facility. It is strongly recommended that safety zones be painted around all machinery. Wherever and whenever possible, wide aisles should be incorporated into the design. Welding areas must be shielded. Guards, goggles and glasses shall be provided and available to all who enter welding, or grinding work areas.

In every instance, fire extinguishers should be provided in accordance with, or in excess of, local codes. Care should be taken to insure that the extinguisher selected is suitable for both electrical fires and other combustible materials. First aid equipment and supplies should be readily available at several locations.

In too many instances, color has been regarded as a luxury or a refinement reserved for residential use or in heavy industrial plants. Laboratory tests have shown that color affects the health, comfort and safety of human beings. Focal colors have been developed to accent hazardous operating areas or machines. Neutral or receding colors cause non-critical or hazardous components to recede and thereby reduce eye fatigue. Most major paint companies have available scientifically selected color code schemes that minimize eye or physical fatigue and at the same time minimize industrial hazards. As most workshops must undergo periodic repainting, it would be just as easy the next time to use the standard safety color codes.

Mr. Taylor is Secretary of the Essex County Park Commission in New Jersey.

A Maintenance Management System for Highways

by Alfred L. Miller

One of the biggest chunks of the maintenance dollar in parks and recreation areas is spent on roadways. Road maintenance is an expensive proposition. Our best estimate of the total maintenance bill for all roads and streets is around five billion dollars. Believe it or not, that figure increases at an annual rate of nearly \$400 million!

Every new road means another surface to patch, more grass to mow and culverts to clean. The task of a maintenance supervisor is fraught with problems. For example, the work is seasonal. It's often difficult to pull together men and equipment to get a job done at a particular time. If the men are regular employees, they have to be kept busy year-round as well.

Keeping the right level of personnel on the payroll is a tricky job. The maintenance supervisor has to calculate how many men and units of equipment are needed to patch potholes, for example. He then needs to ask himself, will the cost per pothole be lowest if three men and a truck are used, or will it be cheaper to use four men and two trucks?

If a supervisor uses a four-man crew on potholes, should he use the same crew on litter pickup? It costs a lot of money to pick up litter, so how should the crew go about doing it? Does it make any difference what size crew is used for the work?

Sure it does, and this is one reason why maintenance supervisors are interested in effective management techniques.

The problem is that everyone has different ideas about maintenance levels. In this case, one supervisor mowed a section of right-of-way twice a year, while another mowed an adjoining section five times. The interesting thing is that in this case, the road classifications were the same, the soil characteristics were identical, and the amounts of rainfall were nearly the same. You would think that the areas would be mowed the same number of times. But it doesn't work that way unless someone has laid out a plan for getting the work done.

The same kind of variations can be found in crew performance. Actual data from spot patching operations shows that productivity might range from one point eight man-hours per ton to over three-and-a-half man hours per ton. In this case, the variations were attributed to differences in the way the work was scheduled

and controlled. Clearly, there are relationships between maintenance levels, production, performance and costs. The real question is how is the work managed?

Management by Objectives

One principle which clearly applies is that maintenance needs to be managed by objectives. A typical objective might be to maintain the park's roads in a safe and satisfactory manner with the most economical use of resources. Maintenance people usually do not think in these terms, so the objectives must be stated in a way that relates to the man on the job.

Ask the man operating a motor grader to explain what he is doing and why. Chances are that he will say he is leveling a road, to take out a dip.

The point is that you have to put objectives in familiar terms, such as the amount of mowing or digging to be done; what is expected in terms of dollars and cents or levels of performance. In effect, objectives need to be translated into day-to-day activities and common measurements of accomplishment.

Another principle that supports managing by objectives is that you have to plan with results in mind. If your objective is to mow the right-of-way three times a year, you have to decide how it will be done. Part of the plan for mowing might include specific routing assignments. At the same time, you must organize efficient combinations of resources. You find out how many men and how many units of equipment are most productive for each activity. If you decide that three men and one truck are best for pothole patching, this is what you use.

Work must be directed according to plan. Obviously, it doesn't make much sense to develop a plan and then ignore it.

Finally, you control work by taking steps to correct significant differences between what was planned and what actually happened. This is control by exception. It means that you compare the amount of work done with the amount planned. It means too, that you look for critical exceptions to performance, find the reasons for the exceptions, and take steps to bring that performance in line.

Managing by objectives, planning with results in mind, organizing efficient combinations of resources, directing according to plan and controlling by exception are the management principles which apply

to maintaining highways and streets. The same principles provide a basis for many of the management procedures being used to plan and control all phases of maintenance.

A typical list of procedures includes several steps—from defining work activities to determining resource needs and establishing a work reporting system.

Step-by-Step

The best place to start is to define the work in terms of the process necessary to achieve the desired result. Surface leveling for example, might be defined as blading and compacting premixed material into depressions to restore irregular surfaces to their designed shape. At the same time, work measurement units should be established for each activity. Such units provide a convenient way of measuring the amount of work needed, and the amount accomplished.

Pothole patching can be defined as hand patching potholes and other small areas of broken or crumbled surfacing. The work can be measured in tons of premix. However, this is only part of the picture. The other part is the work method being used to get the job done. Should all of the loose material be removed? If so, should the area be squared-up? How should the patch be compacted? Are hand tamps sufficient? Questions such as these need to be answered.

Organizing efficient combinations of resources is one of the principles discussed earlier. Obviously, this is also part of the work method. The best combinations of crew size, equipment and materials should be established, for pothole patching, litter pickup and every other activity. All activities have to be analyzed in terms of results.

How much work should be accomplished in a normal day? And how many man-hours should it take to complete the work? How much should it cost? How do you define a quality job?

In effect, a maintenance standard should be established for each activity. The standard defines the work and the unit being used to measure accomplishment. It specifies the combination of men, equipment and materials which usually produce the best results. The standard also provides guidelines about how to get the job done, what is expected in terms of production and productivity.



The next step is to estimate how much of each activity needs doing. This estimate is a work program. Typical estimates for a county might include a half ton of premix per lane mile per year for patching potholes, and 1.5 tons for leveling depressions and bumps. This is one part of a work program. The other part depends on the results of an inventory of the entire highway and street system—the roads, shoulders and acres of grass, stop signs, signs, catch basins. Everything that has to be maintained must be included in the inventory.

The amount of pothole patching is based on applying inventory values to the program estimates. For example, if two-hundred fifty miles of asphalt surface is being maintained, for patching, it's estimated that one-half ton per mile is sufficient to reach a certain level of maintenance. So about one-hundred twenty-five tons are needed this year. Six hundred acres have to be mowed—three times per year. So the mowing work load is 1,800 acres. With this knowledge a budget can be developed—one that fully supports the planned maintenance.

The same kinds of calculations can be made for other jobs. The work load doesn't have to be calculated this way, and it's not as rigid as it seems. Adjustments can be made to account for bad winters, spring floods and other emergencies.

The important thing is the field managers have guidelines which prevent wide variations in maintenance levels. This is the main purpose of work programs. And it's a major step in planning with results in mind.

To make sure there are enough men and equipment to accomplish the work programs, a supervisor needs to determine the number of days or man-hours it will take to complete the job. The work load of 150 tons and the production estimate of 3 tons per day for example, indicate that 50 days of 1,200 man-hours are needed for patching. The same kinds of calculations should be made for every other task.

Efforts should be made to level out the peaks and valleys in the work load by designating the times of the year when certain jobs will be done. A critical step in directing according to plan is to develop scheduling aids or tools. The options here are endless.

One of the best techniques is to put in writing the work to be done during the next week or so. Such a schedule encourages supervisors to make sure the work is balanced with the manpower available. The worksheet also provides space for noting tentative assignments.

Another method is to set up a scheduling board which shows who is to do what work, where and when. Maintenance forms and work orders frequently are used in conjunction with other scheduling tools, just to ensure that the planned work is accomplished.

Several agencies are using preprinted work orders called crew day cards. In effect, a card represents one day's work by a crew on a certain activity. Each card specifies the standard crew size, equipment and materials, and the month when the activity should be scheduled. After the work is done, the card is used to report accomplishments so that supervisors know the results. A work report such as this one, summarizes results that is, who did the work to how much was accomplished. Other reports are appropriate for middle and top management levels. Performance summaries, for example, are one of several kinds of reports which may be useful in pinpointing exceptions to plans and standards.

Work control is knowing when something goes wrong and taking corrective actions to bring results in line with objectives. Experience in several agencies has shown that when these procedures are used, performance increases-more work gets done with existing manpower and equipment. Or it means that the same amount of work can be done at reduced costs.

Obviously, there are other procedures needed to manage maintenance operations, but these procedures are designed to solve problems.

Mr. Miller is a Highway Training Officer with the National Highway Institute of the Federal Highway Administration

Performance Standards for Maintenance

It is rare that you find someone in management who is not involved in the development or execution of performance standards.

In maintenance management, such standards are the most efficient means to define tasks and get the job done.

Many of the articles in this issue cover planning and management techniques. Performance standards are an essential ingredient of good management—they provide a ready ruler to measure progress and efficiency.

Personal performance standards are often broadly defined by job descriptions. In the Management by Objectives process, they are more narrowly defined in joint sessions between employer and employee. In effect, personal performance standards under this system become a contract between the employee and his boss. Periodic review sessions serve as a basis for discussions with supervisors to help overcome deficiencies.

Vast amounts of time are wasted by personnel whose job performance has not been clearly defined or monitored.

Emerson Consultants, a management consulting firm in New York, cites a study of thirty-five typical U.S. plants to demonstrate the enormous amount of time lost by workers:

Bargaining Agreement Time Losses (rest breaks, wash-up time, etc.) and normal plant practice ("Get ready" times, travel time before and after lunch, rest breaks and prior to clock-out) give away 78 minutes of the eight hour shift.

Idle Time (no job assignment, unsanctioned rest breaks and avoidable delay averages 44 minutes per man-day).

Traveling (empty-handed) and *Transporting* (tools and materials) consume 77 minutes per man-day.

Excess Personal (time spent over and above bargaining agreement provisions for eating, drinking, smoking, resting, non-job related conversation, etc.) averages 35 minutes per man-day.

Late Starts and Early Quits at beginning of shift, before and after breaks and prior to shift end use up an additional 21 minutes per man-day.

Waiting (for other crafts, for equipment availability, for materials, etc.) accounts for 22 minutes per man-day.

Getting Job Assignments and Job Instructions takes another 21 minutes per man-day.

Picking Up and Putting Away Tools takes another 25 minutes per man-day.

All this time totals 323 minutes per day, leaving only 157 minutes for real work!

One way to avoid that kind of time loss is to clearly define the tasks required of park maintenance personnel and when those tasks should be accomplished.

The Utah State Department of Highways, in conjunction with Roy Jorgensen Associates, Inc., an engineering and management consultant firm, has developed a detailed set of performance standards that are concise models which may be applied elsewhere. The following selections from the Utah job performance standards handbook give a good indication of the type of standards which make maintenance management effective.

Pothole and Severe Depression Patching

Responsibility

Station Foreman

Definition

The repair of pothole and abrupt depressions, using hand tools and filling with premix material to the level of the remainder of the road.

Quality and Workmanship

Any location where there is a loss of surfacing beyond light ravelling is considered to be a pothole. Any areas where an uncomfortable ride results at about 40 mph is considered to be a severe depression. Each of these should be repaired immediately upon discovery. They should be filled with premix up to where the area is level with the remainder of the pavement.

Scheduling Considerations

Potholes will occur and be repaired intermittently throughout the year. However, a program of specific attention will be performed during the months of *March, April and May* and again during *October* to insure that the road pavements are prepared for the coming summer and winter seasons.

Method and Procedure

1. Place safety devices and signs.
2. Square up and clean potholes, using hand tools.
3. Brush tack oil on vertical sides and bottom of pothole.
4. Shovel material in pothole and level.
5. Compact with hand tamper or truck wheel.
6. Place topping.
7. Scree and compact.

Crew Arrangement

Generally the best staffing arrangement for crew on this operation is three men with one truck. Because of the cost of travel time, two men and one truck are better when traffic conditions permit.

3 Men

1 Truck

1 Loader

This staff provides for one flagman. Some conditions may warrant the deletion of this flagman or an additional flagman.

Surface Replacement

Responsibility

Station Foreman with District Authorization

Definition

Removal of bad surface, as evidenced by heavy cracking, and its replacement with premixed materials. To include replacement of shoulder or pavement surfacing.

Quality and Workmanship

Where existing surface or shoulder materials are broken, cracked clear through, heaved, etc., it should be removed and replaced with premix material. Repaving should be to original elevation. *Bad surface should never be overlayed.*

Scheduling Considerations

Temperature requirements restrict effective surface replacement to the warmer months. Major emphasis should be exerted during the months of *May, June and July*.

Method and Procedure

1. Place safety devices and signs.
2. Remove bad surface with grader. (Using straight blade or scarifier.)
3. Roll gravel where surface was removed.
4. Apply tack oil.
5. Dump or hand place premixed material in area.
6. Bring to original slope and grade with grader or hand tools.
7. Roll for proper compaction.

Crew Arrangement

The best method found to perform this work consists of removing bad surface with a motorgrader, dumping and placing premixed material by hand for a small patch, or with a motorgrader when a large patch, and rolling. Staff and equipment required are:

- 5 Men
- 1 Motorgrader
- 2 Trucks
- 1 Roller
- 1 Loader
- 1 Truck
- 1 Tar Kettle

Two flagmen are provided in this staff. Conditions may warrant the addition or deletion of flagmen.

Grade Gravel or Dirt Road

Responsibility

Station Foreman

Definition

The grading of gravel or dirt roads to include the spot application of aggregate material as needed to fill ruts and soft spots, and for the retention of correct crown.

Quality and Workmanship

Aggregate should be added to those spot locations showing signs of softness or trapping water where the remainder of the road retains reasonable cross-section. Blading should be done first if these areas are occurring near the ditch or are associated with water being carried on the road surface.

Corrugations in excess of 1" should not be permitted. Large rocks, loose surface material, and windows over 4" should be removed.

Crown should be established at 3/4" per foot on flat grade, and 1/4" to 1 1/2" per foot on rolling, hilly or mountainous country. A rooftop crown shall be used.

To provide better compaction, grading should be performed after a rain or when surface materials are moist.

Scheduling Considerations

Because of (1) moisture and temperature considerations and (2) the desirability of preparing the gravel surfaces for the summer and winter conditions, all gravel and dirt roads are to be given specific grading and spot patching attention during the periods of *March, April, May* and again in *September, October, November*. Attention between these periods should be limited to the handling of emergency or hazardous conditions.

Mowing

Responsibility

Station Foreman

Definition

The specifically planned, scheduled and controlled mowing required for the purposes of controlling weeds, eliminating a snow drift line, reducing the likelihood of concealing animals, and maintaining roadside appearance. Generally, mowing is done on a semi-annual (spring-fall) basis, except for Class 5 roads that are mowed once a year and Class 6 roads which are not mowed. If more mowing is required between the spring and fall mowing to maintain the vegetation at less than 14", this should be just for appearance and delineation and should not extend beyond a maximum width of two five-foot cuts from the pavement edge.

Quality and Workmanship

Mowing is performed in accordance with the following guidelines:

1. Vegetation is *not* to be mowed shorter than 5".
2. Mowing is performed when *general* vegetation growth, not isolated weed growth, is 14" or more.

3. If there is a good stand of grass that does not grow taller than 14", no mowing will be required after the grass is 3 years old, unless necessary for undesirable plant growth control.

4. No mowing is to be done on areas too high or too low to be visible from the highway.

5. In fill areas, all vegetation should be cut so no vegetation is higher than the roadway.

6. No mowing should be done on slopes steeper than 3 to 1.

7. In cut areas, mowing should extend to the bottom of the ditch line, if the back slope is steeper than 3 to 1. If the back slope is less than 3 to 1, cut one 5' swath up the slope to help the drainage.

8. First priority in mowing should be given to heavily traveled highways and approaches to towns and cities.

9. If necessary, some hand work may be required around obstructions such as guard rail, sign posts, ditch banks, etc.

Mowing Widths

The mowing width will vary depending upon if the road is an urban or rural road and the road class. The *Vegetation Control Manual* specifies mowing widths and should be used as a guide.

Scheduling Considerations

The semi-annual mowing should be performed during the months of *June* and *October* without regard to vegetation height requirement. The *June* (semi-annual) mowing is intended to coincide with the end of the rapid spring growth cycle in order to cut undesirable vegetation prior to the seed state. Adjustments are to be made when unusually wet or dry years make adherence to the June schedule cut impractical.

The *October* (semi-annual) mowing is intended to eliminate snow drift lines and improve winter-spring roadside appearance.

Appearance and delineation mowing are performed in accordance with the above quality and workmanship criteria during the period of July through the first half of September.

Chemical Control of Vegetation

Responsibility

Special Crew with District Authorization

Definition

The application of chemicals for the purpose of noxious weed elimination, vegetation eradication and growth retardation.

Quality and Workmanship

Chemical vegetation control is performed in accordance with the following guidelines:

1. Chemical control of vegetation will be primarily limited to the semi-annual spring & fall efforts.
2. Only those individuals who have a current license may apply chemicals.
3. Areas to be treated are to be designated and specifically outlined by the District Maintenance Supervisor.
4. Application of soil sterilants is limited to areas such as around marker posts, guardrail, etc. where machine mowing is not possible, and must be applied before freeze-up in the Fall.
5. Chemical application for purposes of roadside appearance (brush control and non-noxious weed control) is to be made only in the isolated and specific locations designated by the District Maintenance Supervisor.
6. Rates of application:
Tordon Beads — 80-120 Lbs. per acre
Amizol 90 — 2-4 Lbs. per acre
Atrazine — 8 Lbs. per acre

Scheduling Considerations

The chemical vegetation control program is to be performed during the spring months of *March, April, May and June* when the growth stage is proper and fall for sterilants prior to freeze-up.

Litter Control

Responsibility

Station Foreman

Definition

The removal of isolated areas of litter and debris along the highway, the emptying of trash barrels and the pickup of litter in picnic areas. *Does not include any work in the larger roadside rest areas.*

Quality and Workmanship

The removal by hand of isolated areas of unsightly litter, debris that has blown off trucks, the emptying of trash or litter barrels, and the litter pickup required in picnic areas.

Scheduling Considerations

The pickup of isolated areas of litter along the right-of-way will be scheduled and performed on an as needed basis.

Emptying of litter barrels and picnic area cleanup should be scheduled on a regular basis as established by each Maintenance Supervisor. The frequency of attention should vary with the season of the year.

Method and Procedure

The pickup of isolated areas of litter and the litter pickup of picnic areas, *when required*, will usually be most effectively accomplished at the same time trash barrels are emptied.

Crew Arrangement

The number of men necessary to accomplish litter control will vary between 1 and 2, depending upon the specific job.

Expected Performance

Because of the varied crew size and operations of this activity, the expected daily production cannot be specifically outlined. However, this activity requires the reporting of an accomplishment (number of barrels emptied/or isolated areas, with comments).





Rest Area Maintenance

Responsibility

Station Foreman

Definition

All maintenance, replacement and custodial or janitorial activities associated with rest areas.

Quality and Workmanship

Maintenance and care of rest areas is to be performed within the following guidelines:

1. Water lawns, flowers, shrubs and trees as required.
2. Clean comfort station facilities at least once per day during the summer season, and as required during the winter season. Inspect daily.
3. Empty trash containers at least once per day during summer season.
4. Mow lawns and clip edges and borders weekly during the growing season.
5. Sweep and pickup litter and debris in the area at least once per day and more frequently if required.
6. Replace broken, damaged or stolen comfort station equipment immediately.
7. Paint facilities as required.
8. Wash facilities, tables, benches, etc. a minimum of once each day during periods of heavy use.
9. Reseed where required and apply fertilizer to lawn, shrubs and trees in the proper season.
10. Have parking lot plowed in winter and shovel walks.
11. Replace light bulbs.
12. Insure constant supply of towels, paper, etc.
13. Act as an ambassador for the state.
14. Have map supply available for public distribution.

Method and Procedure

1. Perform routine activities and duties as required in accord with the seasonal variations.
2. Make note of and mention any need for additional supplies or repairs to the station foreman.

Crew Arrangement

The need for rest area maintenance will vary with the particular location and season. A maximum of 1 man-day per day, seven days per week per rest area during peak season.

Drainage Inspection

Responsibility

Station Foreman

Definition

The systematic inspection of all drainage facilities to insure that the systems are functioning properly and determine required attention.

Quality and Workmanship

Although most drainage systems are designed for a storm that occurs only once in a generation, it is necessary to keep the entire drainage system in working order so that it can handle the very unusual storm or lengthy period of precipitation. Items to be considered during each inspection are: the effect the system has on adjacent areas, and any changes in drainage flow since the last inspection.

Scheduling Considerations

Inspections should be made during or immediately after *each* of the semi-annual drainage programs is completed.

Periodic inspections of known problem areas should be made during heavy rain storms, but should be reported under Activity 161-200 "Routine Drainage Care." After each inspection, a schedule of corrective measures should be made and implemented. Unusual or recurring problems as well as encroachments such as sewage or tailwater being emptied onto the right-of-way should be referred to the District Maintenance Supervisor, who will direct or solicit aid for the appropriate corrections.

Method and Procedure

1. Note installations requiring attention.
2. Schedule corrective actions or refer to Maintenance Supervisor.

Routine Sign and Post Maintenance

Responsibility

Station Foreman

Definition

The routine replacement, straightening and/or painting of signs, sign posts and marker posts. This activity applies to all work of this kind performed by the station crews except that performed as a part of the annual sign and post maintenance program.

Quality and Workmanship

Some routine sign maintenance must be performed as soon as deterioration is discovered; other maintenance can be temporarily postponed until a more convenient time. The following desired quality and workmanship of routine sign maintenance separates that which should be of immediate concern.

Immediate Attention Required—Those signs which are either difficult to read or unreadable because of damage to the message, bent or broken posts, or lost reflectiveness must be replaced or straightened as soon as possible.

As Scheduled Attention—Those signs and/or posts which are damaged, noticeably crooked or in need of paint but are still readable should be replaced, straightened, or painted as they can be worked into the station foreman's weekly schedule.

Method and Procedure

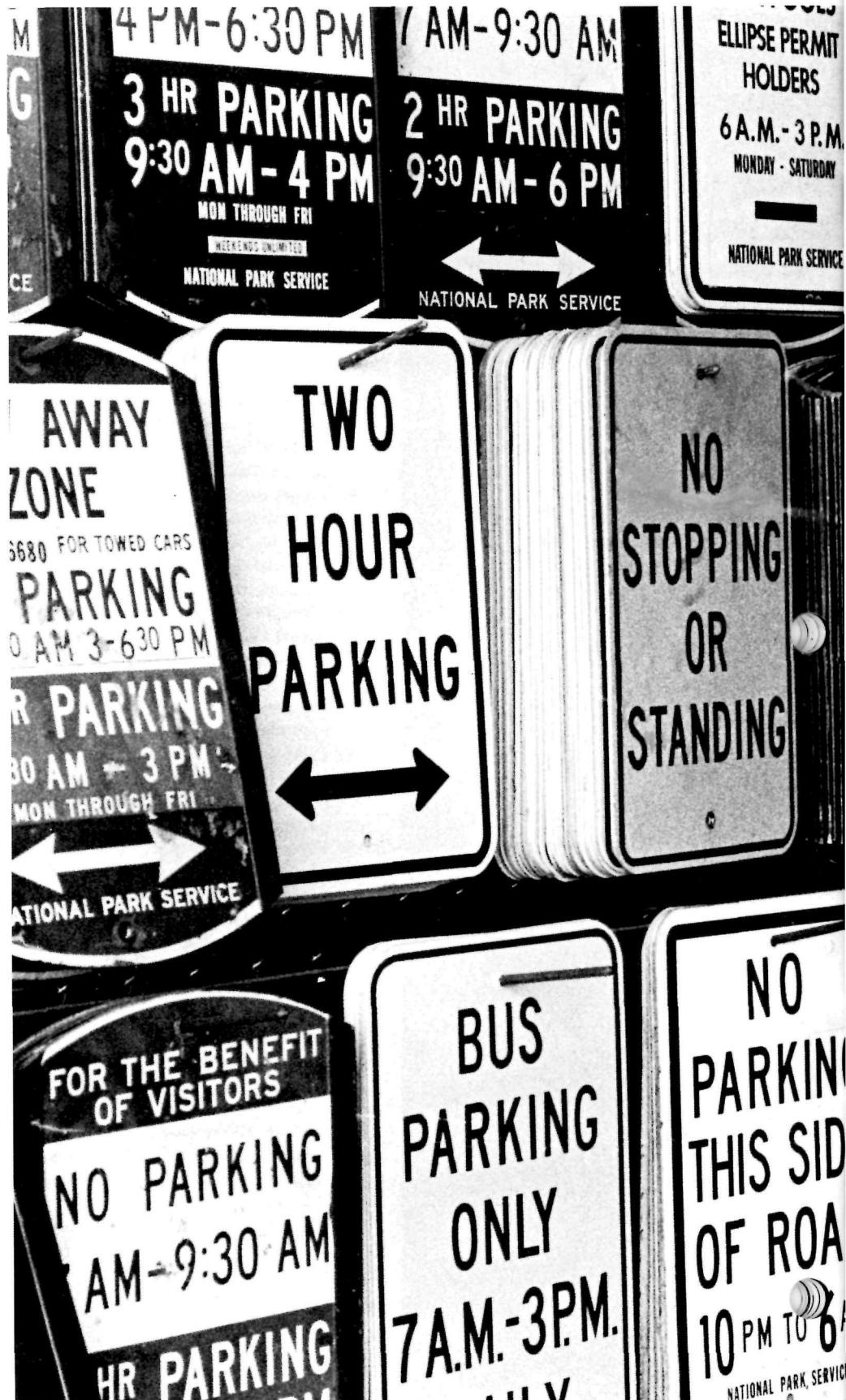
1. Note installations requiring attention.
2. Order materials, if required.
3. Perform replacement, painting and straightening as needed.

Crew Arrangement

Normally this activity can best be accomplished by a crew of 1 or 2 men.

Expected Performance

Because of the varied crew size and operations of this activity, the expected daily production cannot be specifically outlined. However, this activity requires the reporting of an accomplishment (number of installations maintained).





Snow Fence, Snow Markers and Sand Barrels

Responsibility

Station Foreman

Definition

The erection, maintenance and removal of snow fence, snow markers and sand barrels.

Quality and Workmanship

These activities are to be performed in accordance with the following guidelines:

Snow Fence

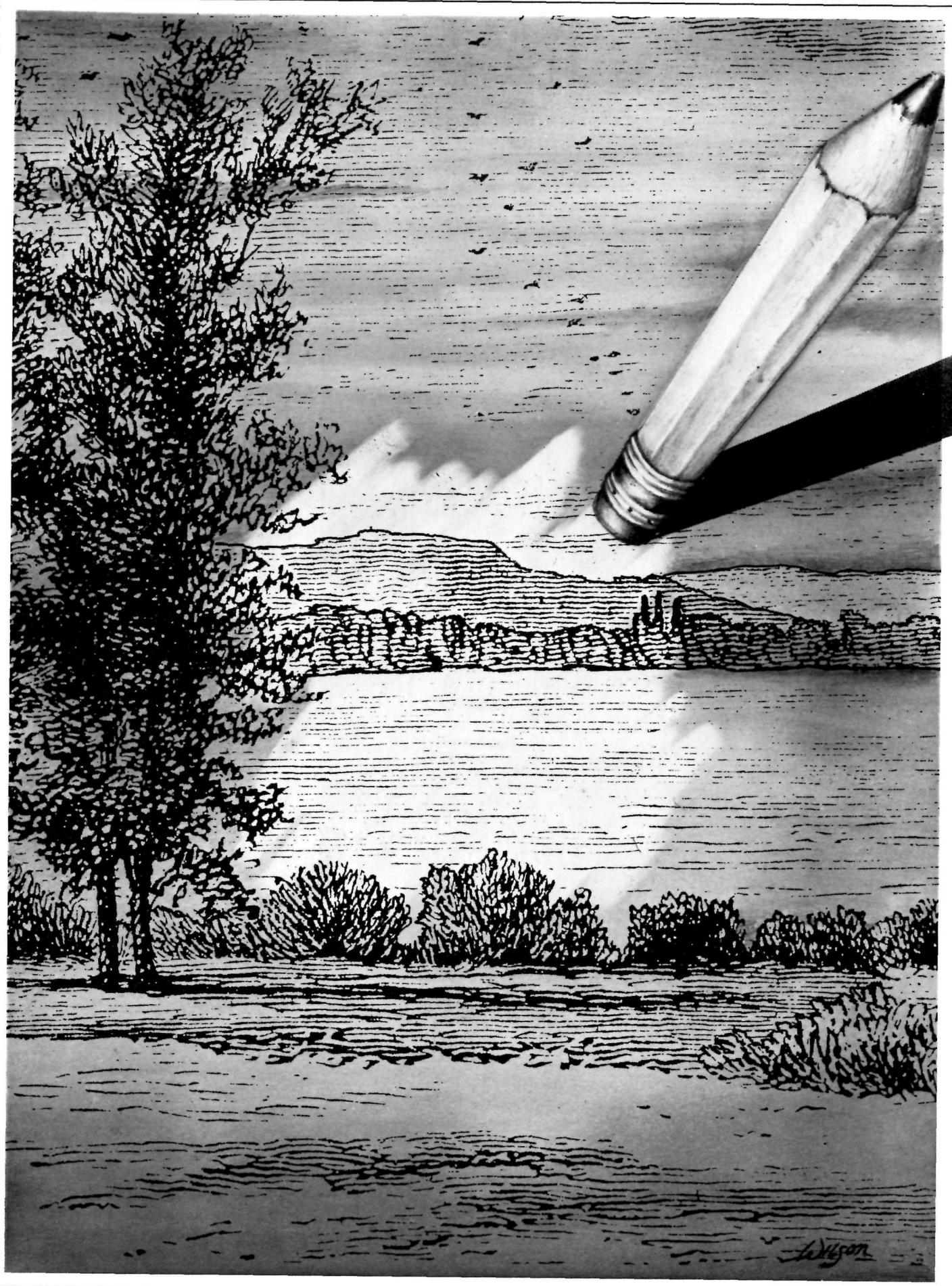
1. Permanent and temporary snow fences are erected only at those locations designated by the District.
2. An annual maintenance and repair program is to be conducted.

Snow Markers

3. Snow markers are to be installed each year in those locations where visibility during snow removal operations is so limited that markers are required to delineate the roadway, guardrails, structures or other obstructions.
4. Replacements or repairs that are required during the snow season are to be made promptly.

Sand Barrels

5. Sand barrels are to be placed only in those remote and isolated areas where use by the public has been demonstrated.
6. Replenishing sand or abrasives should be performed after each storm.
7. Barrels should be brought to the shop each summer for storage and repair.



Pollution Abatement

by Oni Houston

The burgeoning environmental awareness of the nation as a whole has required increasing attention by maintenance personnel to the whole spectrum of pollution and its control.

Maintenance people are the most intimately involved with environmental pollution and its abatement. We are the people who must assure the safety of the drinking water that we furnish the public. We are the ones responsible for seeing that the quality of the sewage effluent we put into our streams is of acceptable standard. We are the ones who see to it that solid waste is picked up and disposed of properly. We are also the ones who have to correct extreme noise pollution conditions (it is frequently our equipment—dozers, trucks, snowplows, generators, blowers, air conditioners, etc.—which cause the noise), as well as assist in the monitoring of radioactivity and pesticide surveys.

One of the major tasks facing maintenance personnel at all levels, and in virtually all maintenance organizations, whether Federal, State, or municipal, is implementation of pollution abatement policies and regulations.

Most pollution sources are, at least potentially, the responsibility and/or under control of the maintenance organization. In addition, most of the pollution *abatement* processes are a maintenance responsibility.

In similar fashion, park facilities and equipment are *sources* of air pollution as well as possible control mechanisms.

Solid waste, noise, radiation, pesticides, etc., are other pollution sources which also are subject to control through the efforts of a maintenance organization.

In 1969, Congress passed the National Environmental Policy Act. It is one of the most complex, far-reaching acts ever passed, and it has already affected every American either directly or indirectly. It has spawned an extremely broad variety of environmental policies, regulations, and laws. Among these are: the Clean Air Act, as amended (42USC 1857); the Federal Water Pollution Control Act, as amended (33USC 1251); the Solid Waste Disposal Act, as amended (42USC 3251); the Noise Control Act of 1972 (42USC 4901); the Marine Protection, Research, and Sanctuaries Act of 1972 (16USC 1431); and the Federal Insecticide, Fungicide, and Rodenticide Act, as amended by the Federal Environmental Pesticide Control Act of 1972 (7USC 136). It is beyond the scope of this article to delineate specific controls contained in these acts—however, all are available in printed form from the Environmental Protection Agency or from your Congressman.

The Environmental Protection Agency (EPA) was established in 1970 to lead coordinated and effective governmental action on behalf of the environment. This means that EPA is charged with administering and enforcing pollution abatement policies and regulations, and promulgating such regulations. EPA also interprets the various Acts, supports research in pollution abatement techniques, develops quality standards, and assists state and local governments and others in anti-pollution activities.

In addition, through the mechanism of Executive Order 11752, EPA is directed to assure that the Federal government provides leadership to the nation in preventing, controlling, and abating environmental pollution. Thus EPA requires that Federal agencies comply with applicable Federal, state, regional, and local substantive environmental standards and limitations. It should be noted at this point, however, that because of the principle of Federal supremacy, Federal agencies do *not* comply with State or local *administrative* procedures.

All of the foregoing is intended to partially point out the degree external pressures have impacted and will continue to impact park and recreation operations.

For example, in the National Park Service, the overall pollution abatement program is concerned with all aspects of environmental pollution which may potentially effect NPS areas—whether generated inside the park or outside. This includes such things as liquid waste, solid waste, air quality deterioration, noise, pesticides, and radioactivity.

Obviously, some of these are a great deal more important at this time than others. Of the first three listed, water quality pollution abatement, through treatment of water and wastewater, has received major emphasis. In a relatively short time, the Park Service has moved from the era of simple septic systems to the present one of highly sophisticated, complex, extended aeration sewage treatment plants.

Simple chlorination of drinking water systems is no longer sufficient. More exacting treatment and much better monitoring of quality is now required. The old "out-of-sight-out-of-mind" philosophy of solid waste disposal is no longer viable, neither are the ugly, open dumps and the dirty, expensive and energy intensive incinerators. New technology for re-use, re-cycling, or safe sanitary landfill must be used instead.

Now, because of the new laws and regulations, park managers are more responsible than ever for pollutants generated in their areas, regardless of who generates them—visitors, concessioners, park residents, or other park staff.

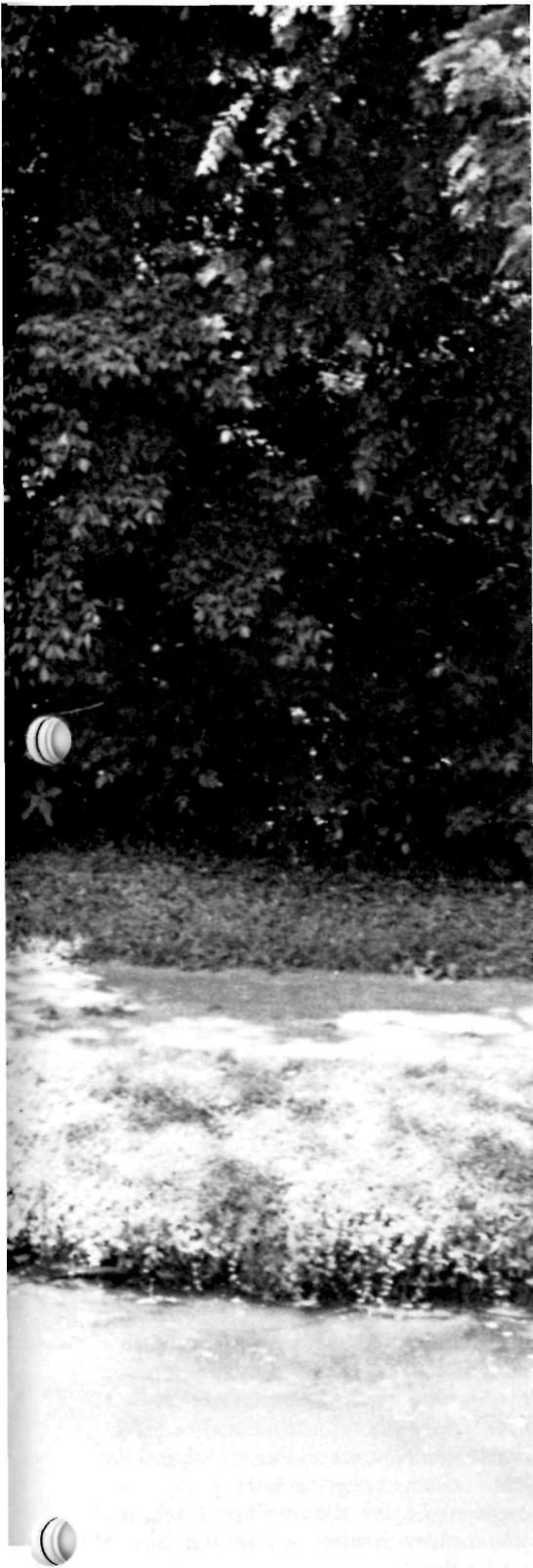
To a lesser extent usually, state and municipal park maintenance operations are effected by the same considerations as are the Federal organizations. However, some states, through their respective environmental protection departments, have developed regulations relating to environmental pollution which outstrip in stringency their Federal counterparts.

Most EPA and other Federal regulations are generally in the form of "recommended" procedures for pollution abatement so far as non-Federal operations are concerned, but the "requirements" sections are mandatory for Federal operations. Funding for non-Federal operations, whether regulations are more or less stringent than Federal, comes from state or municipal appropriations, for the most part. There are, however, some Federal grant funds, usually through the Department of HEW, which may be applied to pollution abatement projects. Each situation is considered on its own merits and should be approached through existing administrative channels.

For a long time, many government land managing people have been viewed by the public as more environmentally aware than the rest of the world, and therefore incapable of environmental wrongdoing. In fact, the public thought that whatever was done to or for the environment by these people just had to be right because of their superior awareness, knowledge, and concern. Unfortunately, this is simply not true.

Some of us in the various government organizations have been in the position of "believing our own publicity." We too, have imagined ourselves not really capable of environmental wrongdoing. As a result, we have not complied with certain, to us, unnecessary aspects of some of the environmental law now in effect. We have used our perennial complaint of insufficient funding to try to escape public ire when we have been discovered in non-compliance and we have pled ignorance of the law as a reason for noncompliance.





When we have done this—at least those of us in the Federal government—it is because we have just not completely understood the various laws or regulations. Virtually all of them specifically exclude ignorance of the law as a reason for noncompliance, and virtually all of them specifically say that lack of funding (unless expressly not appropriated by Congress) is also not acceptable as a reason for non compliance. In other words, we *must* discover what our pollution abatement needs are and request the funding necessary to meet those needs.

To assist us (Federal agencies) in this effort, the Office of Management and Budget (OMB) issued Circular A-106 in December of 1974. This circular sets forth procedures to be followed by Federal agencies in carrying out the portion of E.O. 11752 pertaining to the control of environmental pollution from existing Federal facilities.

Part of the requirements thus set forth is an annual report to be presented to the Director of OMB by the head of each Federal agency. This report contains plans for pollution abatement and waste management at facilities under the agency's jurisdiction. These plans, when submitted to the Director of OMB, represent an agency commitment to comply with applicable standards considering the Federal budgetary process and assuming that the requested funds will be appropriated by the Congress and allocated to the agency as planned.

The procedures provide park managers with a means of annually re-examining and updating their pollution abatement needs. They may then ask for funds to accommodate these needs.

It is important for park managers to work beyond the confines of their park as well. A park area can be effected by seemingly unrelated events occurring at some distance away. For example, our National Park areas contain no industry within them, and, in general, are viewed as relatively closed and self-contained. One would think that the park staff would have an easy task to maintain the existing air quality—just don't permit any industry in the park. Don't even let them put a factory right outside the boundary—and the air quality will remain good forever. It doesn't seem that a proposed construction project miles away outside the boundary should be of any concern, does it?

In this example, the construction project is to result in the development of a coal-fired electric power generating plant, which, even with some mandatory controls and exhaust cleaning devices, will almost surely cause deterioration of the existing air quality. The question which must be considered by the park management is whether the deterioration will be significant. They have a legal, and moral obligation to get an answer to this question.

If they find that because of prevailing winds, the plant's exhaust will significantly deteriorate their area's air quality, they must take certain steps to preclude such deterioration. These steps might include: attendance at public meetings to assure that park users are fully aware of the potential degradation of their area; public testimony at hearings and public meetings on the anticipated effects on the area's environment; participation in efforts to halt the plant's construction, or at least to demand maximum use of all possible exhaust pollution control technology.

Sounds a bit unusual for park personnel, doesn't it? However, this oversimplified illustration may serve to generate some thought on just what park people's responsibilities are nowadays. Things that were formerly outside the purview of park personnel have suddenly assumed a great deal of importance in our operations. This is true whether we like it or not, and whether we are fully aware of it or not.

It therefore behooves us to *become* aware of the new laws and regulations, and to shoulder our responsibilities relating to them. It is no longer possible to sit in our insular park settings and let the rest of the world go by. We must undertake a wide-ranging, critical look at ourselves to assure that we are, in fact, fulfilling our obligations to achieve and maintain clean air and water in our areas.

Mr. Houston is a Civil Engineer with the Maintenance Division, NPS, Washington, D.C.

Occupational Safety and Health

by Fred D. Tidwell

The purpose of the Occupational Safety and Health Act is to assure safe and healthful working conditions for working men and women by authorizing enforcement of the safety standards developed under the Act. The Act assists and encourages the states to assume the fullest responsibility for the administration and enforcement of state occupational safety and health laws developed in accordance with the provisions of the Federal law.

All 50 states, U.S. possessions and the District of Columbia, can be covered by the law. The Federal Government, state and local governments were excluded from the basic Act. However, one section of the Act (Section 19) requires Federal agencies to establish and maintain safety and health programs consistent with the standards developed under the law. Coverage of state and local governments will become effective as states develop approved plans for administering the law. There are 23 states with approved plans. Park and recreation employees of other states will not be covered by OSHA until their respective state develop an approved plan.

States are encouraged to assume responsibility of the development and enforcement of occupational safety and health standards providing equal or greater protection for working employees. In order to have a plan approved by the Secretary of Labor, the state must comply with the following items:

1. Designate a state agency or agencies that will be responsible for administering the plan.
2. Provide for standards which are at least as effective as Department of Labor standards and do not unduly burden interstate commerce.
3. Prohibit advance notice of inspections and provide for right of entry.
4. Provide legal authority and qualified personnel for enforcement of standards.
5. Provide funds for administration and enforcement of standards.
6. Provide an effective occupational safety and health program applicable to all employees of public agencies of the state and its political subdivisions.
7. Require same reports as the Federal law.
8. Provide other reports as required by the Secretary of Labor.

Item 6, under a state plan, covers all employees of public agencies of the State and its political subdivisions that were previously excluded therefore, parks and recreation areas are covered by the OSHAct in this manner.

Many standards published under Section 6 of the OSHAct are applicable to employees working in park and recreation areas. A partial listing of items that park and recreation employees work with on a daily basis is as follows:

Portable Wood Ladders
Portable Metal Ladders
Woodworking Machinery Requirements
Air Contaminants
Hand and Portable Power Tools
Occupational Foot Protection
Eye and Face Protection
Respiratory Protection
Safety Requirements for Scaffolding
Flammable and Combustible Liquids
Spray Finishing
General Materials Handling
Ventilation
Welding, Cutting and Brazing
Compressed Gases
Air Receivers
Abrasive Wheel Machinery
General Walking Surfaces
Machine Guards
Means of Egress, General
Mobile Ladder Stands
Guarding Floor and Wall Openings
Noise Exposure
Explosive and Blasting Agents
Dip Tanks
Fixed Ladders
National Electrical Code (with emphasis on hazardous location Sections)
National Electric Safety Code
Asbestos
Fire Protection
Chlorine
Storage and Handling of Liquidified Petroleum Gases
Acetylene
Oxygen
Heavy Equipment Operations

Any of the above standards may only be a physical standard or it may include requirements for training of employees in procedures to perform certain tasks, require training of employees in use of personal protective equipment, require training in the safe handling of hazardous materials, etc.

The Act also provides for research in the field of occupational safety and health, in-

cluding psychological factors, ways to discover latent diseases caused by the work environment and the establishment of medical criteria which will assure, as far as is practicable, that no employee will suffer diminished health, functional capacity, or life expectancy as a result of his work experience.

Standard reporting procedures with respect to occupational injuries and illnesses are included in the Act to help accurately describe the nature of occupational safety and health problems.

Education and training for personnel in the safety profession as well as training of supervisors and employees for safer job performance is also provided for in the Act. Finally, the development and publication of occupational safety and health standards, such as those listed above, are also provided in the act.

There are 34 sections to Public Law 91-596. These sections cover areas from encouraging joint labor-management efforts to reduce injuries and disease arising out of employment to the authorization of appropriations to carry out the Act. The Law applies to every employer with one or more employees engaged in a business affecting commerce. This includes most employees except domestic workers.

Federal agencies which enforce safety and health laws such as: the Bureau of Mines; Mining Enforcement and Safety Administration; Department of Transportation, Federal Aviation Administration, Coast Guard; U.S Energy Research and Development Administration (Atomic Energy Commission) etc., have enforcement powers and standards which are not affected by the OSHAct. However, in areas where these agencies do not have standards, standards under the Act are enforced by the Occupational Safety and Health Administration.

One important point that many employers and employees do not understand about the OSHAct is the Act has a general clause which states: "*The employer shall furnish employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees.*" Also, the employer is required to comply with safety standards published under the Act.

Employee duties under the Act are to comply with the work safety standards, rules, regulations, and orders published by the Government and/or the employer in accordance with the Law.

Federal safety standards in effect under the Federal Supply Contracts Act, Federal Service Contracts Act, Contract Work Hours and Safety Standards Act (Construction), Longshoremen and Harbor Workers Compensation Act, and National Foundation on the Arts and the Humanities Act or those which became effective after the passage of the OSHAct, were all made a part of the occupational safety and health law.

These safety laws cover an estimated 22 million workers. Some have been in effect since 1927. The new Federal Safety Law adds another 58 million bringing the total workers under Federal safety regulation to an estimated 80 million. Workmen's Compensation laws are not effected in anyway by the OSHAct.

For a period of time after the Act was passed, selections had to be made between national consensus safety standards and established Federal standards. Initially, safety standards published were selected on the basis of improving safety or health for the designated workers or in cases where these two organizations' standards did not agree, the safety standards that assured the greatest protection for the affected employees, were required to be published.

However, the law spells out the procedures the Secretary of Labor must use to publish new safety standards, modify or revoke any existing standards. *Any interested employee, employer, employee organization, nationally recognized standards-producing organization, Government agency (Federal State, County, etc.) may participate in the standard promulgation process by informing the Department of Labor in writing of their interest.* You have the right to state your grounds for proposing new standards or objecting to existing standards. If you have sufficient justification, a notice will be published in the Federal Register and all interested parties are encouraged to participate to insure that the safety standard published provides the greatest protection for the affected employees.

Standards involving toxic materials or harmful physical agents are established based on research, demonstrations and experiments, which most adequately assures the protection of employees, even if the employees are regularly exposed to the substance.

Employees must be warned of hazards they are exposed to, symptoms they will have if overexposed, emergency treatment for the exposure, and precaution necessary for the safe use or exposure of hazardous materials. This is done by using labels required by the standards or other appropriate methods to insure the protection of employees. Also, the standards provide for monitoring of hazards with whatever instrumentation is required, necessary recordkeeping, maintenance of employee medical records, frequent medical checks, and prescribing personal equipment to protect the employee's health.

Procedures are provided for emergency temporary standards, variances from existing standards and judicial review of any standard adversely affecting any employee or employer.

Administration and enforcement of the Law rests with the Department of Labor, and the Occupational Safety and Health Administration. However, the Department of Health, Education and Welfare, National Institute of Occupational Safety and Health (NIOSH), is responsible for conducting educational programs, develop and establish occupational safety and health standards, and conduct research related to occupational safety and health. Other organizations with an important role in the Act are the National Advisory Committee on Occupational Safety and Health, the Occupational Safety and Health Commission, and the Bureau of Labor Statistics.

The 12-member national committee advises, consults with and makes recommendations to both the Secretaries of Labor and HEW. Representatives on the committee are appointed by the Secretary of Labor (8) and Secretary of Health, Education and Welfare (4) on the basis of their experience and qualifications in the field of occupational safety and health. Make-up of the committee requires representation from management, labor, safety and health, and the public with a member of

the public, as chairman. All meetings of the committee are open and records of the meetings are available.

The principal function of the Commission is to adjudicate disputes between an employer and the Secretary of Labor or between an employee and the Secretary of Labor. In other words, the Commission makes decisions regarding contested citations and penalties.

The Commission is composed of three members appointed by the President by and with the advice and consent of the Senate. Members are chosen on the basis of their training, education and experience. Their appointments are staggered to retain continuity. They can only be removed by the President for inefficiency, neglect of duty, or malfeasance in office.

The commission may appoint hearing examiners and other employees to assist in performing its functions. Commission hearings and records are open to the public. Also, the Commission proceedings are in accordance with Federal Rules of Civil Procedures. The Commission may order testimony to be taken by deposition in any proceedings, and any person may be required to appear and produce books, papers, records, etc. in the same manner as witnesses in a Federal Court.

The Bureau of Labor Statistics established methods and requirements regarding recordkeeping and reporting procedures for occupational injuries and illnesses under the Act. A log of all work injuries more serious than first aid must be kept at the establishment where employees work. Also, minimum data must be reported on each of these recordable injuries. A summary of injuries which occurred at the establishment must be posted on the bulletin board where employees normally report to work. Federal recordkeeping and posting requirements are the same as for private industry.

To carry out the purpose of the Act, the Department of Labor compliance officers are authorized to enter any business, factory, construction site, etc., during regular working hours or at other reasonable times, where employees work, to make inspections and investigations. The compliance officer may question privately any owner, employer, employee, agent or

operator in making his inspection or investigation. The Department of Labor may require the attendance and testimony of witnesses and the production of evidence under oath as a result of the Compliance Officer's inspection. Many companies have not been inspected by the Department of Labor because of the limited supply of competent, professional safety personnel.

Inspection priorities were established to get the maximum benefit from available personnel. Work related fatalities and catastrophes which result in hospitalizing 5 or more workers have top priority. Investigating employee reports of unsafe or unhealthful working conditions is next, followed by target industries and target health hazard programs which have a high accident rate or known health problem.

Inspection priorities were established to get the maximum benefit from available personnel. Work related fatalities and catastrophes which result in hospitalizing 5 or more workers have top priority. Investigating employee reports of unsafe or unhealthful working conditions is next, followed by target industries and target health hazard programs which have a high accident rate or known health problem.

Target industries are longshoring, lumber and wood products, roofing and sheet metal, meat and meat products and miscellaneous transportation industries for accident rates. The designated health targets are asbestos, silica, lead, cotton dust and carbon monoxide. General inspections are made last, considering geographic location, size, and cross-section of industry.

A compliance officer is prohibited from giving advance notice of an inspection except under the following circumstances: where it is necessary to protect the employees, when designated persons are required to be present for the inspection, when the inspection is made at times other than regular business hours, or advance notice is required for security reasons.

When a compliance officer arrives at a location to see if the employer and employees are in compliance with the OSHAct, he will show his identification, hold an opening conference with the employer and employee representative to state the purpose of his visit, ask for records that he wants for his inspection, inform the employer that he is required to consult with employees, inspect the workplace, and hold a closing conference with the employer to discuss his findings. If the visit is because of an employee notice of an unsafe or unhealthful working condition, he will give the employer a copy of the complaint.

Any employee who believes that a hazard exists in his workplace may file a complaint by completing OSHA Form 7 which can be obtained from the nearest U.S. Department of Labor, OSHA Office. However, the employee should report the condition to his supervisor and give the employer an opportunity to correct the condition before filing a complaint. The employee has the right to withhold his name from his employer when he files a complaint. Also, an employer shall not discharge or discriminate in any manner against any employee because such employee has filed a complaint or caused proceedings to be instituted by exercising any right afforded to him under the Act.

The Compliance Officer is in charge of any inspection and may deny any person who interferes with the inspection the right to participate.

When an inspection reveals an apparent violation of the safety standards, the compliance officer will issue a written citation describing the nature of the alleged violation, the safety standard allegedly violated, and the period of time allowed to correct the condition.

Citations are required to be posted at the point where the violation occurred or if this is not practicable, the citation must be posted on the bulletin board where employees normally report to work. The citation notice must remain posted until the condition is corrected or for three working days, whichever period is longer. The amount of the financial penalty imposed depends on the type of violation.

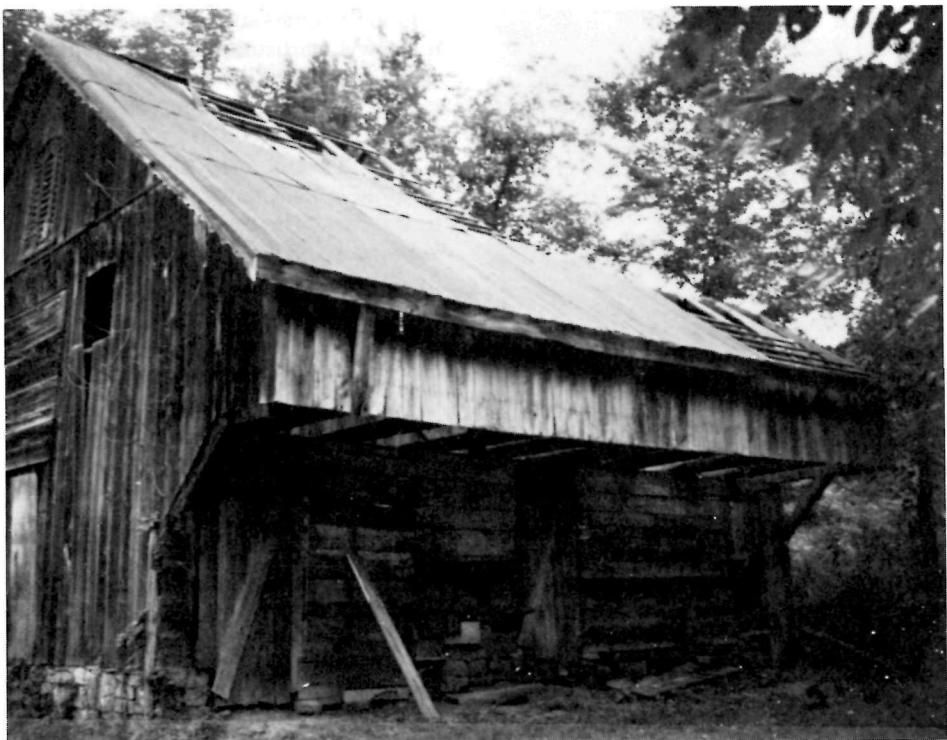
Violations are of four types: imminent danger, serious, non-serious, and de minimis. As previously stated, the employer may contest the citation or the penalty. Also, it should be reemphasized, that if the inspection was made on the basis of an employee complaint and no citation was issued, the employee must be informed in writing of the Department of Labor decision, and the employee has the right to contest the decision. In either case, the incident goes to the review Commission for adjudication. Any employee or employer adversely affected or aggrieved by a decision of the Commission may obtain a review of the decision by a U.S. Court of Appeals.

It is incumbent upon the employer to know the safety standards and see that employees are given instructions in the safe performance of their job, and to see that employees observe safety rules and regulations.

Mr. Tidwell is Chief, Safety Division, NPS, Washington, D.C.

Maintenance of Historic Areas

by Dale Sipes



Maintenance of historic areas presents a whole new set of special challenges requiring skills in historic preservation, in planning and in just plain innovation.

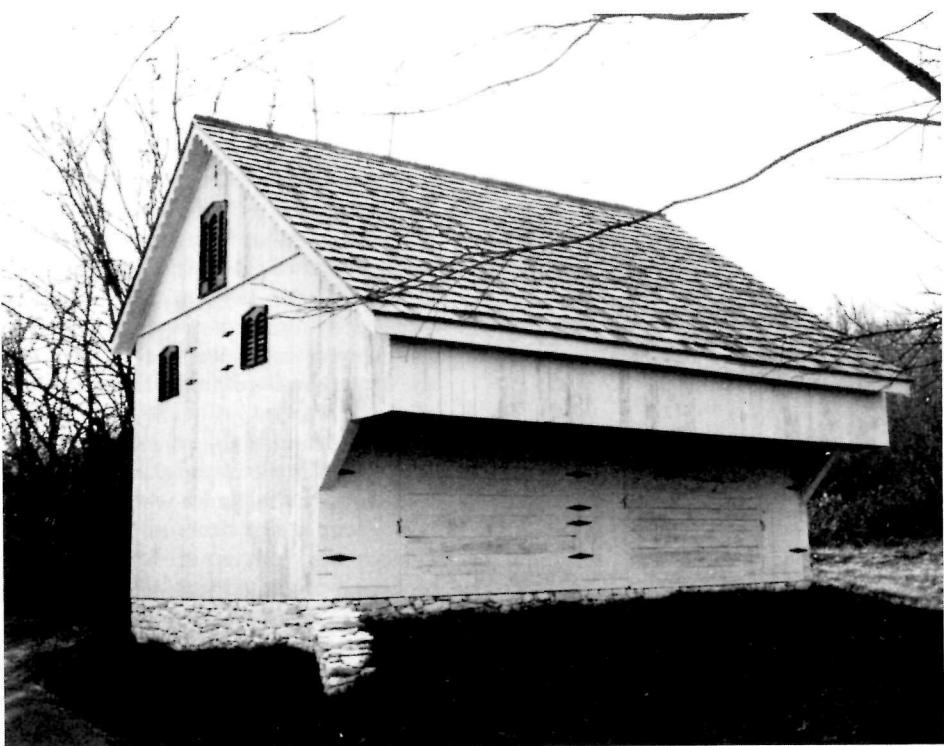
The first step in the maintenance of an historic site is to carefully assess the status of every aspect of the park requiring maintenance—not just buildings, but culverts, dams, walkways, patios. It is crucial that all the elements of the historic area be considered, both the tangible and the intangible. Clear-cut understanding of the park or recreation area's administrative policies with respect to both maintenance and restoration is required.

Maintenance of an historic site does not mean just stabilizing existing structures. Maintenance personnel work on restoration projects, on mothballing, repair and replacement programs.

In the case of an historic site, the interpretive message of the park must be conveyed to the maintenance personnel and integrated with their work.

One of the big problems historic preservation maintenance people often face is that once a site is designated as historic, there is often a long gap between the time it is so designated and the time maintenance begins on the property. The mule barn pictured here, for example, was left neglected for many years. The task of restoring that particular structure required a virtual rebuilding. What few people realize is that accurate restoration requires using the tools and techniques of a bygone era. It is not enough for a structure to *look* like it did a century or more ago; it must be as close to being a duplicate of that structure as possible.

It is difficult for many to comprehend the total efforts expended towards good maintenance of an historic structure when the appearance is aged anyway, and only the surface is obvious. The foundations, bases, and the frames are usually covered, but require considerable attention especially when termites and other pests are detected. Improper drainage can cause problems of saturation before this is detected. Yet, when corrective action is taken, there is really no "on the surface" evidence as to what has taken place.





Good maintenance is unseen on many occasions, particularly in historic areas. A sensitivity to the history of an area is essential to developing a real dedication to the job required.

A good example is a culvert recently restored at the C&O Canal National Historical Park. The average park visitor would scarcely notice the culvert which carries water beneath a road bed near a railroad track. The keystone arch was in need of repair as well as the wall area around the culvert. No maintenance had been done on the structure since 1924. If the park were not a historic site, the easy method to repair the culvert might have been cement retaining walls with a poured concrete tunnel pipe at the center. As a historic preservation maintenance problem, a whole set of considerations came into play.

All the culvert and wall stones were carefully numbered and removed. Historic architects researched the area and the plans were drawn and approved. Painstaking work was done to recut three stones needed to fit within 1/8" for the keystone arch. The land had to be shored up and stones had to be cut to fit the walls.

If the culvert had been left to deteriorate, water from the Potomac River would have destroyed the road above it, altered the direction of the canal, and silled up onto the railway bed. At a cost of \$200,000, the eight-foot culvert was restored, not just repaired, and the canal was preserved for future generations.

During its 100 years of operation, the C&O Canal was held together in many respects by maintenance crews. These people were craftsmen and performed the entire gamut of chores to maintain the canal.

The problems to be considered are vast—what is the physical and visual effect of any maintenance work, either to repair or restore a structure? In many instances, the work requires that historic tools be reproduced and historic methods be used to give the same effect as the original structure.



If a structure is to be stabilized or restored, vegetation, adjacent buildings and major trees close to the structure must be examined and controlled. If a building is to be cleaned, care must be taken not to destroy important details. For example, what effect does detergent have on historic interiors. What about steam or sand blasting? At the same time, one must consider the effect of user damage—what about mud, sand and salt being tracked into an historic building? What can be done to remedy the problem?

Training

To answer these questions requires training and experience. We are constantly faced with a scarcity of trained personnel. We need in-house training, specialized training, and the close working relationship achieved by a team of maintenance people, historic preservation architects and researchers.

Craftsmen or maintenance men should serve apprenticeships on the job. It is appropriate to begin with the trades and crafts personnel we have, but we cannot stop there. It has to be a continuing program covering all the aspects of preservation methods. Areas which have similar types of historic structures requiring similar application and similar environmental conditions could run training programs cooperatively. There is no need to spend a great deal of time and effort with draftsmen who would be exposed only to limited environmental conditions.

Without fail, it is necessary to involve supervisory personnel at levels where planning, programming and field efforts are concerned. This level of training needs to emphasize the responsibilities, approaches, preventive measures and priorities. Both groups should gain the knowledge of training others and be equipped to pass on acquired skills.

A third level of training is equally important and would involve the managers at the park level and the regional authorities at either the Federal, state or county levels. The priorities are important at this level so that these individuals

can gain an appreciation of the actual methods, techniques and skills necessary in historic preservation maintenance.

Guiding Principles

One key area which must be considered is the acts of Congress or state legislatures which pertain to historic structures and their restoration or reconstruction. Providing maintenance efforts to stabilize structures for a period of time is part of the job. Any work done to a structure should be carefully documented.

It is not always possible however, to stabilize a structure which is sorely in need of repairs. Valuable time, funds and efforts can be lost, too, in preparing elaborate plans, making lengthy studies, applying expensive methods and techniques, when only preservation maintenance is necessary.

A final item that has plagued the efforts of many in the accomplishment of restoration projects is the use of park personnel versus contractors to accomplish many maintenance projects.

The C&O Canal National Historical Park has been quite involved in the stabilization of many historic structures during fiscal years '74, '75 and '76. Projects of very similar natures were accomplished by both contract and Park forces providing day labor. The cost in each instance when similar work was done by Park forces, was considerably less than contractors. On several occasions, opportunities provided for contractors to bid on projects that could have been accomplished by park day labor forces. Bids from contractors came in exceedingly high and park forces accomplished the project at a much lesser cost figure. When the parks have the facilities and expertise to accomplish maintenance projects and do not do the job better and more economically, it is probably due to poor management.

We in the parks do not have to make a profit, we do not have to do the job any better than we expect the contractor to do, and we can be more conservative in many ways if we assume the contractor's role. The poor programming, coordination, cooperation, and wastefulness would come to an end if proper standards were set and adhered to.

In most cases park forces avoid damage to nearby areas when tackling a specific project such as access roads, trees, and other objects that seem to always be in the way of a contractor. When each contract is let, new people are on the scene, and the sensitivity and dedication are really never developed concerning the park facilities and resources. Many services *can* be put to contract and benefit the Park when proper evaluations are made and sufficient justifications are prepared.

Maintenance in historic areas is an exciting, ever-changing profession. Every task presents a new set of problems which calls on one's ingenuity and ability to properly research the period in which a structure was built. After years in this field, I have gained a particular respect for and appreciation of the craftsmen and maintenance people of years gone by. It is this link with the past which makes the work so rewarding.

Mr. Sipes is Chief of Maintenance, C&O Canal National Historical Park, NPS.

Cost Analysis, Budgeting and Maintenance Financial Records

by Theodore H. Schaefer, Jr.

Mr. Schaefer's article was prepared for The Park and Recreation Maintenance Management School at the North Carolina State University. The school is a two-year education program for park and recreation executives and supervisory personnel headed by Dr. Robert E. Sternloff of the University's Department of Recreation Resources Administration, School of Forest Resources. This article is reprinted with the author's and the school's permission.

Maintenance

Downgrading the maintenance function is a symptom of top management neglect which can be identified by:

1. Excessive machine wear and breakdowns.
2. Frequent emergency work.
3. No preventive maintenance program.
4. Unkempt grounds and facilities.
5. Inadequate training program for personnel.

All this seems a bit ironic when many departments' maintenance budgets are very high. The fact of the matter is that:

"Principles and practices which have been used and proved in production have not often been extended to maintenance. The fact that few or none of the following procedures are regularly employed indicates the lack of management techniques in maintenance," says E. T. Newbrough in his book on *Effective Maintenance*.

Organization Planning

Written Procedures

Performance Measurement

Planning and Scheduling

Training Programs

Motivation Techniques

"All maintenance services should be initiated in writing to prevent unimportant, unnecessary and unauthorized work and develop a record of work done . . ." says Newbrough.

Maintenance requests should be detailed on a standard form including:

Date of origin

Date of completion is desired

Account to which cost of time and material is to be charged

Priority

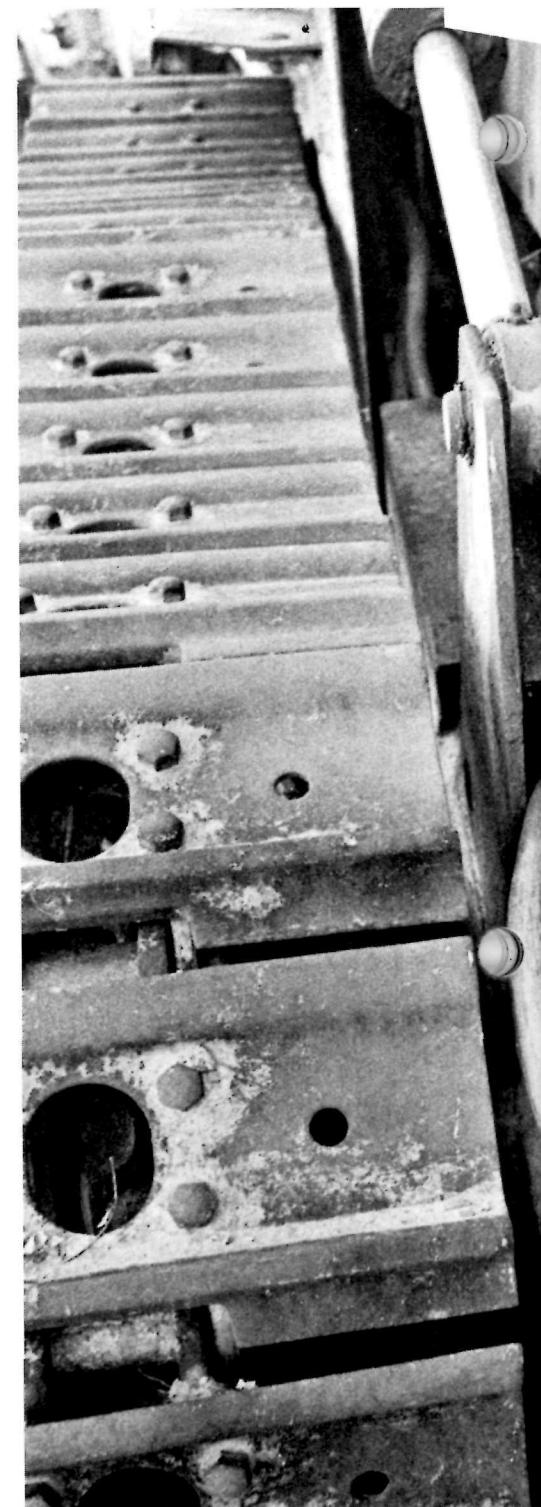
Description of work to be done

Signature of request of origin

Maintenance Work Classification

Whether the maintenance department is small or large, the number of forms can be minimized and procedures simplified by classifying maintenance work according to the type of activity. To be most effective, the classifications should not overlap. This outline is for a factory operation, but implications for parks and recreation are valid.

1. Preventive maintenance
 - a. Inspect and adjust
 - b. Oil and grease
 - c. Replace worn parts and make minor repairs as the result of preventive maintenance
 - d. Clean
 2. Repairs
 - a. Emergency repairs
 - b. Routine repairs and parts replacements which are not the result of preventive maintenance
 - c. Routine repairs of buildings, grounds, and utilities
 3. Major overhaul
 - a. Renovation of machinery and equipment
 - b. Renovation of buildings, grounds and utilities
 4. New construction
 - a. Modifications of, or additions to, existing machinery and equipment
 - b. Modifications of, or additions to, existing buildings, grounds, and utilities
 - c. Installation of new machinery and equipment
 - d. Erection or construction of new buildings, grounds, and utilities
 5. Safety
 - a. Construction, erection, installation, or alterations to promote safety
 6. Manufacturing
 - a. Construction of parts or equipment used for repair, renovation, or construction
 - b. Construction of parts or units used directly in processing plant products
- Classification aids in the quick analysis of costs, since it separates true maintenance cost from cost of activities not related to keeping present machinery, equipment, and facilities operable. Classification does not, however, enable us to determine unit costs or to determine which machines have exceptionally high maintenance costs.

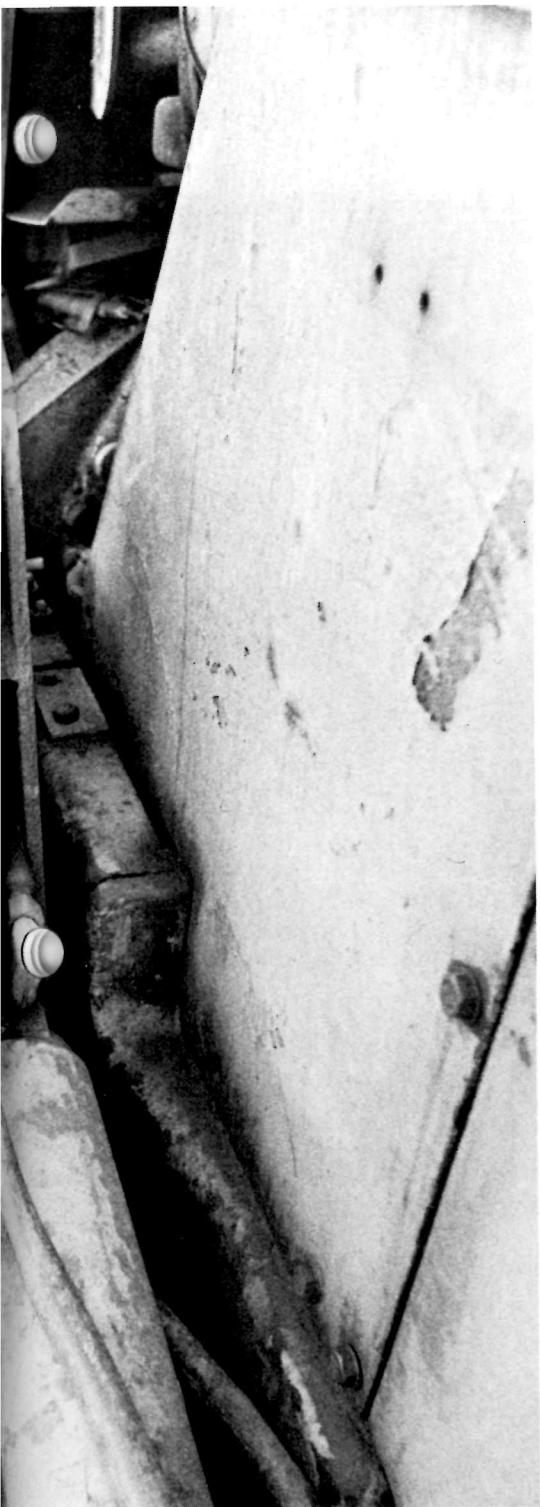


Work order forms and procedures may take several forms:

1. Preventive maintenance
2. Repairs
3. Major overhauls

Form information should include:

1. Date completed
2. Cost center
3. Equipment number
4. Maintenance type



"Accurate reporting of maintenance work time is essential if meaningful cost and production reports are to be established, say Jones and Trentin in their book *Budgeting: Key to Planning and Control*.

1. Time clock—job ticket
2. Work order
3. Daily time card
4. Special forms

Unless the maintenance work performed is analyzed and weakness corrected, similar work may be necessary again the next day, the next week or even next month.

The manager must ask himself continually—are the men doing good work? Do the machines have inherent weaknesses? Maintenance requests provide a continuous historical record of each piece of machinery, equipment or job.

In order for the manager to accomplish plans, he has several tools available: the budget, cost analysis, systems and computers.

Budget

"A budget is a financial plan representing management's best reasonable estimate of expenditure during a definite future period. Budgets are, therefore, statements of anticipated results. They should reflect actual plans and should be based on actual expectations rather than informed guesses as to what is likely to happen," say Jones and Trentin.

There are two basic reasons why budgetary planning and control techniques command special attention in non-manufacturing businesses:

1. Planning and control are universal functions in all business—whether the basic mission is to provide goods or services.
2. Budgeting is probably not as well developed in many service companies as manufacturing companies.

State and local governments are suffering financial problems that seem to grow at alarming proportions as years pass.

A municipal budget represents a one year plan of the amount and types of revenue a city or county government plans to raise and the way in which it plans to spend it. Budgets are a basic planning and control system. The budget must be regarded as a system, because there is an

5. Maintenance area
6. Work order number
7. Date issued
8. Department or location
9. Date wanted
10. Approved by
11. Equipment name
12. Standard hours
13. Materials or special equipment

inference to a process which continues throughout the year. Three major functions of the budget can be expressed as planning, execution and control.

In order for a budget to succeed, it must begin as a grass roots operation in which all levels of the management team participate.

Jones and Trentin suggest that budgeting takes on three phases:

1. The job of preplanning

Work that generally must be done about one half year preceding the budget year so that a budget framework may be prepared. Analysis is made of previous experience as related to economy, departmental objectives and an analysis leading to the development of ground rules by the director.

Once the objectives are established for the next five years, the management team must decide how the projected revenues will satisfy the volume services. In these considerations are involved capital budget projections for the department, manpower development programs, and the way in which funds will be obtained to finance the effort. The preplanning phase culminates in a broad operating plan for the year from two basic sources of data: environmental factors and company objectives. This plan is issued to the operating divisions or bureaus for development of their individual plans and budgets to best accomplish the objectives.

2. Actual preparation of the budget

When the various bureau and division heads receive the plan, they each prepare an operating plan for the next year. The director receives the budgets back and they are reviewed. After review they are sent to the County Executive and finally to the Council for action.

3. Control of operations

With the approval and publication of the budget for the fiscal year, the budgeting function begins. This control feature involves preparation of periodic reports comparing performance with the budget. Variances or departures of actual operations are highlighted in these reports. In such instances, the budget director analyzes the variances and notifies the manager. The primary function of the

manager comes into the decision making process. There are basically three decisions that can be made:

- a. The plan of operations can be changed to achieve the budgeted result.
- b. A departure from the plan can be authorized.
- c. A change in the budget plan can be authorized.

The most common budget used in government today is the Line Item of Object of Expenditure Budget. Lines of the budget are coded by number, title or both. An example of such a system might be:

10 Personnel Services
11 Salaries and Wages
12 Social Security
13 Retirement
14 Employee insurance
15 Workmen's Compensation
16 Overtime Premium
17 Other Compensation
18 Pensions
20 Contractual Services
30 Supplies and Materials
40 Business and Travel Expense
50 Capital Outlay
60 Other Operating Expense
70 Other Expenses
80 Interfund Charges and Reimbursements

Each object and item would be delineated as was number 10, with a description of each item. For purposes of brevity, just the objects were listed.

Advantages

Easy to prepare

Easily understood by legislative body and public

Establish breakdowns for statistical comparisons

Disadvantages

Attention focused on objects of expenditure, not objects to be achieved.

Preoccupation with objects of expenditures causes reluctance to secure measures of performance

Tendency toward centralized rather than departmental control of expenditures is increased

Another type of budget used to a lesser degree is the Program Budget. Attention in this budget is given to input by an objective classification of expenditures. Attention may also be given to output by using supporting performance statistics.

Advantages

1. Expenditure data according to the functions and activities carried on
2. Supporting data regarding both input and output to be anticipated in the budget year
3. Responsible administrators are going to do their best to accomplish their program goals

Disadvantages

1. Tendency to obscure the factors (more equipment, price change in materials)
2. Limitation of the degree of freedom allowed to administration officials
3. Greater sophistication of staff. Less control than line item because it does not spell out line item.

Finally, the third and perhaps the most realistic budget, is the Performance Budget. The performance budget goals are to develop a realistic measure of output—what are you doing, determine and measure an appropriate level of service and place major emphasis upon the relationship of impact to output.

Advantages

1. Identifies the functions, activities, and work programs to be undertaken and their respective cost
2. Effective control of the flow of money and work
3. Consideration of a myriad of details into concise terms
4. Meaningful direction of policy and management decisions on all levels

Disadvantages

1. Difficulty in achieving the required participation at all levels
2. Increased sophistication—larger numbers of management personnel needed for supplemental accounting system
3. Inability to measure in meaningful statistical terms
4. Stress upon quantitative standards and no adequate qualitative standards exist

Three phases of budget planning, preparation and control, as related to governmental budgeting, might well be:

- a. Estimates from reporting units
 - b. Preparation of estimates by units.
- Usually by line item budget, but possibly by one of the other two methods
- c. Submission and action by bureau chiefs
 - d. Submission and action by department head
 - e. Submission and action by Chief Executive

- f. Budget consolidation and submission to legislative branch for action
- g. Budget execution and control

The full range of costs and effects of proposals are typically neglected. The future implications of proposals beyond the budget year are generally neglected. Current budget decisions invariably have consequences on future costs and services.

What effect does the improvement have on:

- a. Extra employees
- b. New equipment
- c. Contract arrangements and other services
- d. Annual maintenance and program costs

Two areas of strengthening the budget preparation would be welcomed by the chief executive and the public. The strengthening centers around clarity.

"Alternatives are often not adequately considered or presented to the chief executive. If alternatives are presented, they are seldom explicitly evaluated against fundamental public purposes.

"Thus city or county executives have little information on which to consider options" say Jones and Trentin.

More extensive analytical back-up to program proposals are required to strengthen the budget process.

Fundamental purposes of proposed programs.

- a. Objectives not sufficiently public purpose oriented
- b. More appropriate program analysis and evaluation

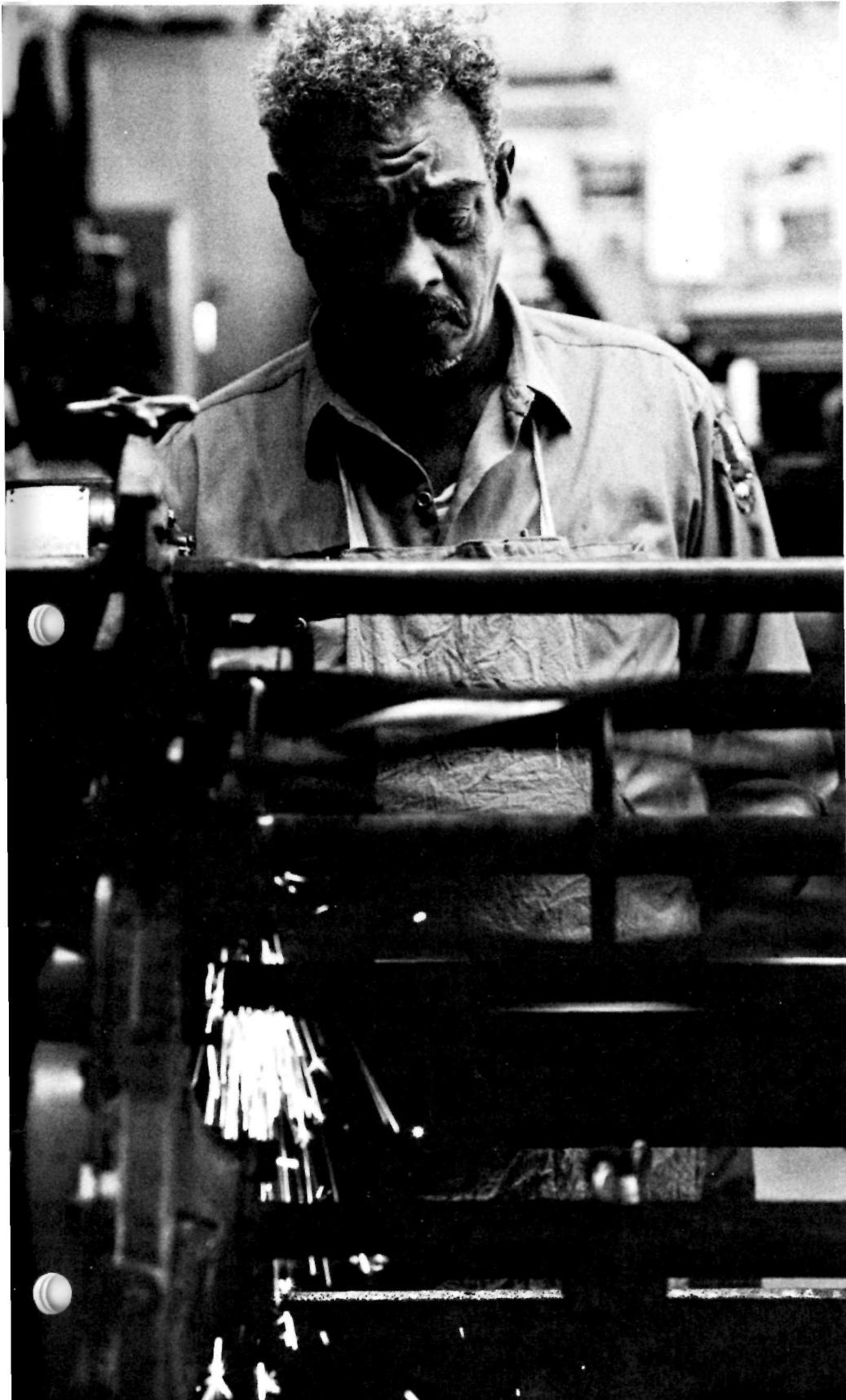
1. Full Costs—operating and capital, both direct and indirect

Future implications should be in terms of three to five years.

May, in *Accounting Principles* says this concept of a budget is a "cohesive plan for organizing people to create a total financial responsibility for future performance, it is important that various managers and others, to whom responsibility for attainment of budgets has been given, become involved in every possible way."

Motivation

1. Managers should have a part in suggesting new concepts and objectives.



2. Managers should be involved in the planning stages, timing of budget information and methods of plan achievement.
3. Systematically report out the facts and require explanations of out of line situations.

Reporting

Before establishing a budget program, develop a prompt, regular reporting system of financial results.

Controlling

In the control phase, can actual results be compared with budgetary goals? Can variations between actual results and planned results be investigated and analyzed and action taken to correct the variations while the operations continue? Control must extend beyond mere investigation and analysis. It seeks rather to make management responsible for a plan working together by assigning each manager his share of the financial responsibility.

Organizing

Budgets, as most functions, require "care and feeding"—care to see that all responsible managers become involved, and feeding to insure that all responsible plans are put together, followed up by adequate reporting and variations promptly brought forward.

Staffing

Proper staffing insures not only that budgets are attained, but persons responsible for their execution are held accountable for their performance. Nothing will fail more completely than a neglected effort perpetuated by understaffing. Enthusiasm that goes into preparation cannot and will not be carried forward unless there is constant supervision. We are dealing with people who need to be told when they are doing a good job as well as when they are doing a job below an acceptable level.

Types of Budgets

Operation and maintenance budget

- a. Administrative Work—positions that exist because of an organization's structure—a manager of a bureau.
- b. Measurable Work—includes all jobs that are relatively repetitive and often routine. Work performed where the number of personnel can be related to some measure of activity.

c. Program Work—includes research-related or technically oriented jobs. Jobs where work load is related to programs undertaken by the organization rather than to repetitive activity. Again we emphasize control in sufficient detail to insure that every group and section knows what its responsibilities are and to whom they report.

A second element of basic control is the establishment of proper systems for performing the necessary work at a reasonable cost. A critical review of the organization of a company many times reveals poor methods which slow progress and cost excessive in overhead.

In considering work measurement, the following items should be noted:

- a. Engineered standard based on actual time studies
- b. Appropriate predetermined standards
- c. Use of historical data
- d. Sample various batches of current work

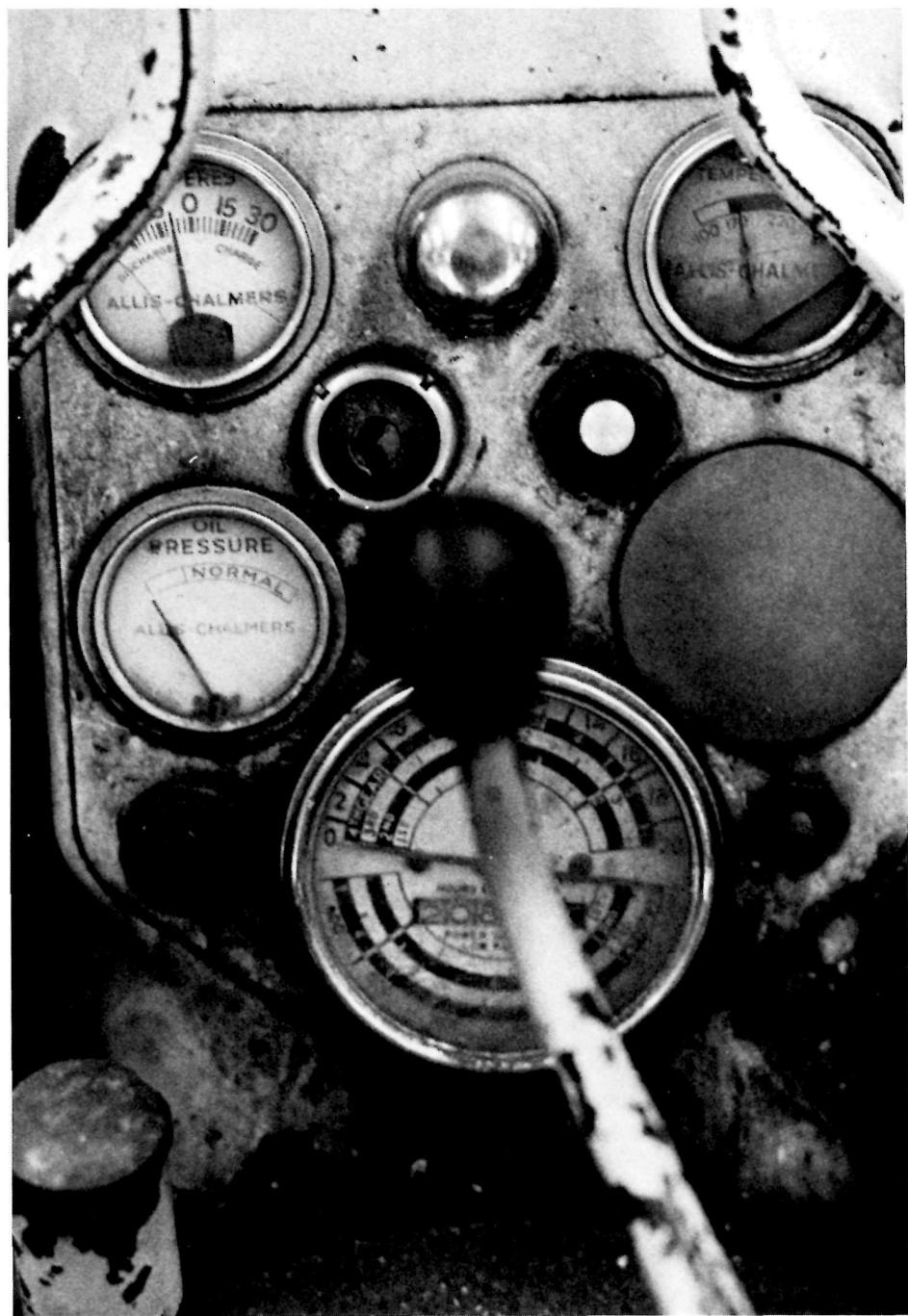
Jones and Trentin also state: that, the final step is to express in dollars the standards developed; this is done by adding average wage or salary rates, to benefits or overhead. One has, in effect, a standard cost system for the office which provides a powerful productivity-related tool for cost control, and a means equitably charging other groups for service."

Maintenance Financial Reports

Leaving the topic of budgets hardly seems appropriate without discussing financial records. Records are tools of management, the memory of the organization, and sources of many kinds of information.

The increase in the number of financial records required by most governmental institutions is cumbersome—yards of print out sheets are more of a liability to management than an asset. Sound record management on the other hand, can aid the manager as a valuable tool. Agencies trying to organize or reorganize their financial records should start by setting down their goals and objectives. An example of a goal may be:

Review the department's maintenance financial records and establish a system of financial records consistent with legal requirements of the municipality and projected growth for a five year period.



Objectives

1. Establish retention periods for each kind of record so that records are destroyed promptly but never prematurely when no longer needed.
2. Divide retention periods into three stages—active, semiactive, and inactive—for each record.
3. Provide some mechanism to allow departments the opportunity of final approval before records are destroyed.
4. Establish a simple procedure for withdrawing records from storage and returning them for refiling, and for following up and retrieving delinquent returns.
5. Organize a system that will "police" the movement of records through the files and ensure observance of established retention periods.
6. Assure that a history (where stored, when, how, and by whom destroyed) of every record transferred to non-current storage is automatically provided as a by-product of the indexing procedure.
7. Establish "security files" by proper use of microfilm and other methods from which to replace lost, stolen, or misplaced documents such as engineering drawings and other vital records.

High Cost of Keeping Records

Arthur Barcan, executive director of the Records Management Institute of New York, says:

"In the United States today, we are creating and keeping more than 8,500 pieces of paper for every man, woman, and child. United States business is long overdue in substituting professional techniques (of records management) for 'just plain hunches and common sense.'"

Records management is not limited to mere destruction of records as they become obsolete. The first step in any permanent program is controlling record making and standardizing forms. Perhaps one person should be responsible for controlling this facet of the department.

"Of the records of the average company, less than 10% must be kept indefinitely or permanently; another 20% must be retained in office space to meet current operational needs; approximately 30% can and should be transferred to less expensive storage space, approximately 35%, the balance, can be destroyed" says Barcan.

These facts become very important when the department is renting office space on a square foot basis.

While there is no complete agreement as to the wisdom of setting objectives that carry over into the area of assigning responsibility for the overall records program, there is general agreement to some aspects of records organization:

1. Records responsibility should be assigned to a member on the staff organization chart.
2. Records administration should not be removed very far from top management who alone should make the policy decisions.
3. The creation, administration, preservation and destruction of records are not separate problems, but different aspects of the same problem.

Every agency by law is required to retain records for certain periods of time. Trying to research and give examples of records that must be kept, and retention time would be an impossible and useless task to undertake in this article. Simply passing the subject by would be just as unrealistic. We will approach the topic, outlining in general terms, financial records a manager in maintenance may find

useful, and a brief description of the record.

Classification of accounts should be by fund, department, bureau, object and item. This varies from agency to agency. In Howard County we use a nine digit account system:

5-11-0801-23

5—Indicates the last digit of the fiscal year

11—Indicates the fund number—General Account

08—Department of Recreation and Parks
01—Bureau of Division—Office of Director

23—Contractual services—telephone

Your organization's ability or need to keep this kind of detail must be determined. Make sure you are in on the planning process.

The following is a report of various classification of expenditures and other records reported by David G. Dinger in a 1974 monograph. They are by no means intended to cover everything that may confront you as a manager, but should begin to open some new doors.

Classification of Expenditures

Governmental expenditures may be classified on several bases. Classification by organization unit shows expenditures on the basis of the department, division, bureau, or other administrative unit which makes expenditures that are required in carrying out its designated functions. Classification by character refers to the fiscal period which benefits from a particular expenditure, and classification by object refers to the commodity or service obtained from a specific expenditure. Classification by functions and activities refers to the purposes for which expenditures are made and the specific types of work performed to accomplish such purposes. The character, object, function and activity classifications recommended by the National Committee on Governmental Accounting are given below.

Classification by Character

1. *Current Expenses* are outlays which primarily benefit the current fiscal period.
2. *Capital Outlays* are outlays which benefit both the current and future fiscal periods.
3. *Debt Service* represents outlays in the form of debt principal payments, periodic interest payments, and related service charges for benefits re-

ceived in part during prior fiscal periods as well as in current and future fiscal periods.

Auditing of Governmental Units

A. Revenues and Receipts

1. General

- a. Make tests to determine that money collected by all departments, boards, commissions, offices, or individuals has been turned over promptly and intact, to the treasurer, in accordance with laws, ordinances, or regulations, and has been credited to the proper funds.
- b. Determine that all money received by the treasurer has been deposited promptly and intact to the credit of the government unit.
- c. Examine governing legal provisions with special reference to the protection of funds that are handled by officials in an ex officio capacity.
- d. Test the accuracy of cash receipts records, noting whether cash or its equivalent in current funds has been received for receipts issued.
- e. Test cash transactions between funds, between divisions of the governmental unit, and between the governmental jurisdictions.
- f. Review the authority for all cancellations, remissions, adjustments, or abatements.
- g. Review general journal entries involving revenues and receipts.

Mr. Schaefer is Director of Howard County's Department of Recreation and Parks in Maryland.

Who Can You Turn To?

AGRONOMY

American Forage and Grassland Council, 121 Dantzler Court, Lexington, Ky. 40503.

American Society of Agronomy, 677 S. Segoe Road, Madison, Wis. 53711.

Crop Science Society of America, 677 S. Segoe Road, Madison, Wis. 53711.

Soil Conservation Society of America, 7515 N.E. Ankeny Road, Ankeny, Iowa 50021.

Soil Science Society of America, 677 S. Segoe Road, Madison, Wis. 53711.

ARCHITECTURE

American Institute of Landscape Architects, 6810 North 2nd Place, Phoenix, Ariz. 85012.

American Society of Landscape Architects, 1750 Old Meadow Road, McLean, Va. 22101.

BOTANY

American Assn. of Botanical Gardens & Arboreta, Inc., Horticulture Dept., New Mexico State Univ., Las Cruces, N.M. 88003.

Botanical Society of America, New York Botanical Garden, Bronx, N.Y. 10458.

BULBS

All-America Gladiolus Selections, 3008 Centralia Ct., Jeffersonville, Ind. 47130.

BUSINESS

MANAGEMENT—SUPPLIES

Lawn & Garden Distributors Assn., 1900 Arch Street, Philadelphia, Pa. 19103.

Mail Order Assn. of Nurserymen, Inc., Roachdale, Ind. 46172.

National Association of Store Fixture Manufacturers, 53 W. Jackson Blvd., Chicago, Ill. 60604.

National Foundation for Consumer Credit, Inc., 1819 H St., N.W. Washington, D.C. 20006.

National Greenhouse Mfrs. Assn., Box 128, Pleasantville, N.Y. 10570.

Point-Of-Purchase Advertising Institute, Inc., 60 East 42nd St., New York, N.Y. 10017.

Society of the Plastics Industry, Inc., 250 Park Ave., New York, N.Y. 10017.

Specialty Advertising Assn., International, 740 N. Rush St., Chicago, Ill. 60611.

CONSTRUCTION

American Land Development Association, 604 Solar Bldg., 1000 - 16th St., N.W., Washington, D.C. 20036.

Arizona Landscape Contractors Assn., 326 W. Cambridge Ave., Phoenix, Ariz. 85003.

Associated Landscape Contractors of America, Inc., 1750 Old Meadow Road, McLean, Va. 22101.

Associated Landscape Contractors of Oregon, 222 S.W. Harrison St., Suite GA-7, Portland, Ore. 97201.

Associated Landscape Designers and Contractors, 702 N. 65th St., Seattle, Wash. 98103.

California Landscape Contractors Assn., Inc., 6252 E. Telegraph Rd., Los Angeles, Calif. 90040.

Golf Course Builders of America, 806 15th St., N.W., Washington, D.C. 20005.

Illinois Landscape Contractors Assn., Box 484, Bloomingdale, Ill. 60108.

Minnesota Landscape Maintenance Assn., Inc., 6643 Colfax Ave. N., Minneapolis, Minn. 55430.

Ornamental Growers Assn., 645 N. Milwaukee Ave., Wheeling, Ill. 60090. **Professional Landscape Contractors of Ohio**, 2265 Green Road, Cleveland, Ohio 44121.

Texas Landscape Contractors Assn., 7700 Northaven Road, Dallas, Tex. 75230.

Wisconsin Landscape Contractors Assn., 4209 35th St., Milwaukee, Wis. 53211.

ECOLOGY AND ENVIRONMENT

Conservation Foundation, The 1717 Massachusetts Ave., N.W., Washington, D.C. 20036.

Council on Environmental Quality, 722 Jackson Pl., Washington, D.C. 20006.

Environmental Protection Agency, Office of Public Affairs, Washington, D.C. 20460.

Keep America Beautiful, Inc., 99 Park Avenue, New York, N.Y. 10016.

National Wildlife Federation, 1412-16th St., N.W., Washington, D.C. 20036.

The Nature Conservancy, Suite 800, 1800 N. Kent St., Arlington, Va. 22209.

ENGINEERING

Acoustical Materials Association, 335 E. 45th St., New York, N.Y. 10017.

Air Conditioning & Refrigeration Institute, 1815 N. Fort Meyer Drive, Arlington, Va. 22209.

American Gas Association, 420 Lexington Ave., New York, N.Y. 10016

American Institute of Architects, 1735 New York Ave., N.W. Washington, D.C. 20006.

American Institute of Planners, 1776 Massachusetts Ave., N.W. Washington, D.C. 20036.

American Management Association, 135 W. 50th St., New York, N.Y. 10020.

American Society of Heating, Refrigerating & Air Conditioning Engineers, Inc., 345 E. 47th St., New York, N.Y. 10017.

American Society of Mechanical Engineers, 345 E. 47th St., New York, N.Y. 10017.

American Society for Testing Materials, 1916 Race St., Philadelphia, Pa. 19103.

American Standards Association, 10 E. 49th St., New York, N.Y. **Asphalt and Vinyl Asbestos Tile Institute**, 101 Park Ave., New York, N.Y. 10017.

Associated General Contractors of America, 1957 E St., N.W. Washington, D.C. 20006.

Association of American Soap & Glycerine Producers, Inc., 295 Madison Ave., New York, N.Y. 10017.

Building Research Institute, 2100 Pennsylvania Ave., N.W. Washington, D.C. 20037.

Carpet Institute Inc., 350 5th Ave., New York, N.Y. 10017.

Chemical Specialties Manufacturers Association, 50 E. 41st St., New York, N.Y. 10017.

Copper & Brass Research Association, 420 Lexington Ave., New York, N.Y. 10016.

Fire Equipment Manufacturers Association, Inc., One Gateway Center, Pittsburgh, Pa. 15222.

Institute of Sanitation Management, 55 W. 42nd St., New York, N.Y. 10036.

National Board of Fire Underwriters, 85 John St., New York, N.Y. 10038.

- National Electric Contractors Association**, 7315 Wisconsin Ave., Bethesda, Md. 20910.
- National Electrical Manufacturers Association**, 155 E. 44th St., New York, N.Y. 10017.
- National Fire Protection Association**, 60 Batterymarch St., Boston, Mass. 02110.
- National Safety Council**, 425 N. Michigan Ave., Chicago, Ill. 60601.
- National Sanitary Supply Association, Inc.**, 159 N. Dearborn St., Chicago, Ill. 60601.
- National Terrazzo and Mosaic Association**, 24 West Loudoun St., Leesburg, Va. 22075.
- National Utility Contractors Association**, 815 15th St., N.W., Washington, D.C. 20005.
- Structural Clay Products Institute**, 1520 18th St., N.W., Washington, D.C. 20036.
- Underwriters Laboratories, Inc.**, 207 East Ohio St., Chicago, Ill. 60611.
- National Association of Reinforcing Steel Contractors**, 10533 Main St., P.O. Box 225, Fairfax, Va. 22030.
- Associated Equipment Distributors**, 615 W. 22nd St., Oak Brook, Ill. 60521.
- National Association of Home Builders**, 15th & M Sts., N.W., Washington, D.C. 20005.
- National Society of Professional Engineers**, 2029 K St., N.W., Washington, D.C. 20006.
- National Asphalt Pavement Association**, Calvert Building, 6811 Kenilworth Ave., Riverdale, Md. 30840.
- National Limestone Institute**, 1315 16th St., N.W., Washington, D.C. 20036.
- FARM EQUIPMENT**
- American Society of Agricultural Engineers**, 2950 Niles Rd., St. Joseph, Mich. 49085.
- Farm and Industrial Equipment Institute**, 410 N. Michigan Ave., Chicago, Ill. 60611.
- Farm Equipment Manufacturers Assn.**, 230 S. Bemiston, St. Louis, Mo. 63105.
- Farm Equipment Wholesalers Assn.**, Suite 1100, Upper Midwest Bldg., Minneapolis, Minn. 55401.
- National Farm & Power Equipment Dealers Assn.**, 2340 Hampton Ave., St. Louis, Mo. 63139.
- FERTILIZERS**
- Association of American Plant Food Control Officials, Inc.**, Department of Biochemistry, Purdue University, West Lafayette, Ind. 47907.
- Association of Official Analytical Chemists**, P.O. Box 540, Benjamin Franklin Sta., Washington, D.C. 20044.
- Fertilizer Institute, The**, 1015 18th St., N.W., Washington, D.C. 20036.
- National Fertilizer Solutions Assn.**, 1701 W. Detweiller Drive, Peoria, Ill. 61614.
- Potash Institute of North America, Inc.**, 1649 Tullie Circle, N.E., Atlanta, Ga. 30329.
- FLORISTS**
- Society of American Florists**, 901 N. Washington St., Alexandria, Va. 22314.
- FLOWERS—PLANTS**
- All-America Rose Selections, Inc.**, P.O. Box 218, Shenandoah, Iowa 51601.
- All-America Selections**, Box 1, Gardenville, Pa. 18926.
- American Begonia Society**, 14036 Ramona Dr., Whittier, Calif. 90605.
- American Boxwood Society, The**, P.O. Box 85, Boyce, Va. 22620.
- American Camellia Society**, Massee Lane, Box 212, Ft. Valley, Ga. 31030.
- American Dahlia Society, Inc.**, 345 Merritt Ave., Bergenfield, N.J. 07621.
- American Fern Society**, Biological Sciences Group, University of Connecticut, Storrs, Conn. 06268.
- American Hibiscus Society**, P.O. Box 98, Eagle Lake, Fla. 33839.
- American Iris Society, The**, Missouri Botanical Gardens, 2315 Tower Grove Ave., St. Louis, Mo. 63110.
- American Orchid Society, Inc.**, Botanical Museum of Harvard Univ., Cambridge, Mass. 02138.
- American Plant Selections**, 4331 N. Front St., Harrisburg, Pa. 17110.
- American Primrose Society**, 14015 84th Ave., N.E., Bothell, Wash. 98011.
- American Rhododendron Society**, 2232 N.E. 78th Ave., Portland, Ore. 97213.
- American Rose Society**, P.O. Box 30,000, Jefferson-Paige Road, Shreveport, La. 71130.
- Bedding Plants, Inc.**, 1421 Cedarhill Dr., East Lansing, Mich. 48823.
- Bromeliad Society, The**, 647 S. Saltair Ave., Los Angeles, Calif. 90049.
- Cactus & Succulent Society of America, Inc.**, 2631 Fairgreen Ave., Arcadia, Calif. 91006.
- Herb Society of America**, 300 Massachusetts Ave., Boston, Mass. 02115.
- Holly Society of America, Inc.**, 407 Fountain Green Rd., Bel Air, Md. 21014.
- National Association of Plant Patent Owners**, 230 Southern Building, 15th & H Sts., N.W., Washington, D.C. 20005.
- National Chrysanthemum Society, Inc., USA**, 394 Central Avenue, Mountain Side, N.J. 07092.
- National Fuchsia Society**, 10934 E. Flory St., Whittier, Calif. 90606.
- North American Gladiolus Council**, 30 Highland St., Peru, Ind. 46970.
- North American Lily Society, Inc.**, North Ferrisburg, Vt. 05473.
- Orchids, Inc.**, 3555 E. Douglas, Wichita, Kans. 67218.
- Roses, Inc.**, 1152 Haslett Road, Haslett, Mich. 48840.
- FRUITS AND VEGETABLES**
- United Fresh Fruits & Vegetables Assn.**, 1019 - 19th St., N.W., Washington, D.C. 20036.
- GARDENING**
- Garden Centers of America**, 230 Southern Building, 15th & H Sts., N.W., Washington, D.C. 20005.
- Garden Writers Assn. of America**, 101 Park Ave., Room 607, New York, N.Y. 10017.
- International Garden Club, Inc.**, Bartow-Pell Mansion, Museum & Garden, Pelham Bay Park, New York, N.Y. 10464.
- Men's Garden Clubs of America**, 5560 Merle Hay Rd., Des Moines, Iowa 50323.
- National Council of State Garden Clubs, Inc.**, 4401 Magnolia Ave., St. Louis, Mo. 63110.
- National Garden Bureau**, Box 1, Gardenville, Pa. 18926.
- Professional Grounds Management Society**, 1750 Old Meadow Road, McLean, Va. 22101.

- HORTICULTURE**
- American Horticultural Society**, Mt. Vernon, Va. 22121.
- American Society for Horticultural Science**, National Center for American Horticulture, Mount Vernon, Va. 22121.
- Horticultural Dealers Assn., Inc.**, 99 Church St., New York, N.Y. 10007.
- Horticulture Research Institute, Inc.**, 230 Southern Bldg., Washington, D.C. 20005.
- IRRIGATION**
- Irrigation Technical Services**, P.O. Box 268 Lafayette, Calif. 94549.
- Sprinkler Irrigation Assn.**, Suite 310, 13975 Connecticut Ave., Silver Spring, Md. 20906.
- NURSERY AND LANDSCAPING**
- Alabama Nurserymens Assn.**, 860 Terrace Acres, Auburn, Ala. 36830.
- American Assn. of Nurserymen, Inc.**, 230 Southern Bldg., Washington, D.C. 20005.
- American Nurserymen's Protective Assn.**, R.R. 2, Box 25, Indianapolis, Ind. 46231.
- American Rock Garden Society**, 90 Pierpont Road, Waterbury, Conn. 06705.
- Arizona Nurserymen's Assn.**, 326 W. Cambridge, Phoenix, Ariz. 85003.
- California Association of Nurserymen**, 1005 Eighth St., Sacramento, Calif. 95814.
- Canadian Nursery Trades Association**, 1568 Carling Ave., Ottawa, Canada K1Z 7M5.
- Colorado Nurserymen's Assn.**, 1814 S. Meade, Denver, Colo. 80219.
- Connecticut Nurserymen's Assn.**, P.O. Box 352, West Haven, Conn. 06516.
- Del-Mar-Va Association of Nurserymen**, Box 306, Selbyville, Del. 19975.
- Eastern Regional Nurserymens Assn.**, 101 Executive Blvd., Elmsford, N.Y. 10523.
- Florida Nurserymen & Growers Assn.**, 2016 S.W. 27th Terrace, Ft. Lauderdale, Fla. 33312.
- Georgia Nurserymen's Assn.**, 190 Springtree Road, Athens, Ga 30601.
- Greater Atlanta Nurserymen's Assn.**, 107 Lakeview Ave., N.E., Atlanta, Ga. 30305.
- Idaho Nursery & Tree Assn.**, 9707 Fairview Ave., Boise, Idaho 83704.
- Illinois State Nurserymen's Assn.**, 645 N. Milwaukee Ave., Wheeling, Ill. 60090.
- Indiana Association of Nurserymen, Inc.**, Entomology Hall, Purdue University, W. Lafayette, Ind. 47907.
- Iowa Nurserymen's Assn.**, 7261 N.W. 21st St., Ankeny, Iowa 50021.
- Kansas Association of Nurserymen**, 4707 W. 6th St., Topeka, Kans. 66606.
- Kentucky Nurserymen's Assn.**, Kentucky Agricultural Experiment Station, University of Kentucky, Lexington, Ky. 40506.
- Lake County Nurserymen's Assn.**, P.O. Box 135, Mentor, Ohio 44060.
- Louisiana Nurserymen's Assn.**, Box 4492, University of Southwestern Louisiana, Lafayette, La. 70501.
- Maryland Nurserymen's Assn.**, 2800 Elnora St., Silver Spring, Md. 20902.
- Massachusetts Nurserymen's Assn.**, 715 Boylston St., Boston, Mass. 02116.
- Metropolitan Detroit Landscape Assn.**, P.O. Box 550, Wayne, Mich. 48184.
- Michigan Association of Nurserymen**, 5127 Aurelius Road, Lansing, Mich. 48910.
- Minnesota Nurserymen's Assn.**, Box 271, Hastings, Minn. 55033.
- Mississippi Nurserymen's Assn.**, P.O. Box 42, Lumberton, Miss. 39455.
- Missouri Association of Nurserymen**, 9850 Gravois, Affton, Mo. 63123.
- Montana Association of Nurserymen**, 1102 S. Grand Ave., Bozeman, Mont. 59715.
- National Landscape Assn.**, 230 Southern Bldg., Washington, D.C. 20005.
- Nebraska Assn. of Nurserymen**, 2342 S. 40th St. Lincoln, Nebr. 68506.
- New England Nurserymen's Assn.**, P.O. Box 352, West Haven, Conn. 06516.
- New Hampshire Plant Growers Assn.**, R.F.D. 2, West Franklin, N.H. 03235.
- New Jersey Assn. of Nurserymen**, Dept. of Horticulture & Forestry, Rutgers University, New Brunswick, N.J. 08903.
- New York State Nurserymen's Assn.**, Inc., 101 Executive Blvd., Elmsford, N.Y. 10523.
- North Carolina Nurserymen's Assn.**, Box 5023 College Station, Raleigh, N.C. 27607.
- North Dakota Nurserymen's Assn.**, Highway 81, South Fargo, N.D. 58102.
- Ohio Nurserymen's Assn.**, 1540 W. 5th Ave., Columbus, Ohio 43212.
- Oklahoma Nurserymen's Assn.**, 4717 W. Park Place, Oklahoma City, Okla. 73127.
- Pennsylvania Nurserymen's Assn.**, Hilltop & Ridge Rds., Boiling Springs, Pa. 17007.
- Rhode Island Nurserymen's Assn.**, 339 Woodward Hall, University of Rhode Island, Kingston, R.I. 02881.
- South Carolina Nurserymen's Assn.**, Horticulture Dept., Clemson University, Clemson, S.C. 29631.
- South Dakota Nurserymen's Assn.**, P.O. Box 1014, Aberdeen, S.D. 57401.
- Southern Nurserymen's Assn.**, 3813 Hillsboro Rd., Room 227, Nashville, Tenn. 37215.
- Tennessee Nurserymen's Assn.**, P.O. Box 57, McMinnville, Tenn. 37110.
- Texas Assn. of Nurserymen**, 512 E. Riverside Dr., Suite 207, Austin, Tex. 78704.
- Utah Assn. of Nurserymen**, 3500 S. 9th East, Salt Lake City, Utah 84106.
- Vermont Plantsmen's Assn.**, Reading, Vt. 05062.
- Virginia Nurserymen's Assn.**, Box 87, Rescue, Va. 23426.
- Washington State Nurserymen's Assn., Inc.**, 1201 25th Ave. Ct., N.E., Puyallup, Wash. 98371.
- West Virginia Nurserymen's Assn.**, 415 Jefferson Rd., S. Charleston, W. Va. 25309.
- Western Association of Nurserymen**, 9305 Vaughn, Raytown, Mo. 64133.
- Wholesale Nursery Growers of America, Inc.**, 230 Southern Bldg., Washington, D.C. 20005.
- Wisconsin Nurserymen's Assn.**, Jackson, Wis. 53037.
- PEST CONTROL**
- Assn. of American Pesticide Control Officials, Inc.**, 1615 S. Harrison Road, East Lansing, Mich. 48823.
- Chemical Specialties Manufacturers Assn.**, 1001 Connecticut Ave., N.W., Washington, D.C. 20036.
- CPI (Crop Protection Institute) Biological Research Center**, P.O. Drawer S, Durham, N.H. 03824.

Entomological Society of America, 4603
Calvert Road, College Park, Md. 20740.

National Agricultural Chemicals Assn.,
1155 15th St., N.W., Washington, D.C.
20005.

**National Assn. of Insect Electrocuter
Manufacturers**, P.O. Box 150, Clinton
Corners, N.Y. 12514.

National Pest Control Assn., 8150
Leesburg Pike, Suite 1100, Vienna, Va.
22180.

National Sprayer and Duster Assn., 680
Wrigley Bldg., N., 410 N. Michigan
Ave., Chicago, Ill. 60611.

Weed Science Society of America, 425
Illinois Bldg., 1113 N. Neil St.,
Champaign, Ill. 61820.

POWER EQUIPMENT—PARTS

Automotive Service Industry Assn., 230
N. Michigan Ave., Chicago, Ill. 60601.

**Maryland Lawn Mower Dealers Assn.,
Inc.**, P.O. Box 68, Kingsville, Md.
21084.

**Outdoor Power Equipment Institute,
Inc.**, Suite 903-05, 1725 K Street N.W.,
Washington, D.C. 20006.

Power Saw Manufacturers Association,
P.O. Box 7256, Belle View Station,
Alexandria, Va. 22307.

SEED/SOD

American Rhododendron Society,
2232 N.E. 78th Ave., Portland,
Oregon 97213.

**Assn. of American Seed Control Offi-
cials**, Seed Laboratory, Univ. of Ken-
tucky, Lexington, Ky.

Atlantic Seedmens Assn., 101 Park Ave.,
New York, N.Y. 10017.

Better Lawn and Turf Institute, 991 W.
Fifth St., Marysville, Ohio 43040.

**Cultivated Sod Association of New Jer-
sey**, Cook College, Rutgers University,
New Brunswick, N.J. 08903.

Delaware Turfgrass Assn., Agriculture
Hall, Univ. of Delaware, Newark, Del.
19711.

Florida Turfgrass Assn., 903 Lee Rd., Or-
lando, Fla. 32810.

Highland Colonial Bentgrass Comm.,
Dept. G., Suite One, Rivergrove Bldg.,
2111 Front St., N.E. Salem, Oregon
97303.

Manhattan Ryegrass Growers Assoc.,
P.O. Box 415, Hubbard, Ore. 97032.

Merion Bluegrass Assn., 101 Park Ave.,
Rm. 607, New York, N.Y. 10017.

New Jersey Turfgrass Assn., P.O. Box
231, New Brunswick, N.J. 08903.

**Oregon Chewings and Creeping Red
Fescue Commission**, 1349 Capitol St.,
N.E., Salem, Ore. 97303.

**Oregon Highland Colonial Bentgrass
Commission**, 2111 Front St., N.E.,
Salem, Ore. 97303.

**Oregon Ryegrass Growers Seed Com-
mission**, 2111 Front St., N.E., Salem,
Ore. 97303.

**Society of Commercial Seed
Technologists**, Colborn Seed Testing
Service, 2600 Woods Blvd., Lincoln,
Nebr. 68502.

Sod Growers Assn. of Michigan, 60 Rush
Lake Rd., Pickney, Mich. 48169.

Sod Growers Assn. of Mid-America,
15515 Wolf Rd., Orland Park, Ill. 60462.

SOIL CONDITIONERS

Peat Producers Assn. of the United States,
1224 17th St. N.W.,
Washington, D.C. 20036.

Perlite Institute Inc., 45 W. 45th St., New
York, N.Y. 10036.

**U.S. National Committee of the Interna-
tional Peat Society**, 2202 Washington
Ave., Silver Spring, Md. 20910.

TREES

American Forest Institute,
1619 Massachusetts Ave., N.W.,
Washington, D.C. 20036.

International Shade Tree Conference,
Inc., P.O. Box 71, 3 Lincoln Sq.
Urbana, Ill. 61801.

National Arborist Assn., 3537 Stratford
Road, Wantagh, N.Y. 11793.

National Christmas Tree Assn., 225 E.
Michigan St., Milwaukee, Wis. 53202.

TURF RESEARCH

Central Plains Turfgrass Foundation,
Waters Hall, K.S.U., Horticulture,
Manhattan, Ks. 66506.

**Oklahoma Turfgrass Research Founda-
tion, Inc.**, 115 Life Science East, Ok-
lahoma State University, Stillwater,
Okla. 74074.

Turf Research Foundation, 101 Park
Ave., New York, N.Y. 10017.

Awards

The Division of Federal, State and Private Liaison, in cooperation with the National Park Service (NPS) Incentive Awards Committee, announces that three NPS employees have been selected for cash awards in the Park Practice Publications Program including *Trends*, *Grist* and *Design*.

Receiving the 1975 awards of \$25.00 each are:

Stan Lock, Interpretive Specialist in Washington, D.C. with the Division of Interpretation for guest editorship of the Environmental Education issue of TRENDS, April/May/June issue;

Alan Robinson, environment specialist at the Denver Service Center for his article, "Marine Parks: Planning for Recreation, Interpretation, and Environmental Education" in the July/August/September issue of TRENDS; and

Fred Young, Park Technician at Pictured Rocks National Lakeshore for a money-saving idea for evening programs at campgrounds published in the July/August, GRIST.

The Park Practice awards are selected each calendar year beginning January through December for National Park Service employees who have contributed outstanding articles or original ideas that have been published in one of the three Park Practice publications.



