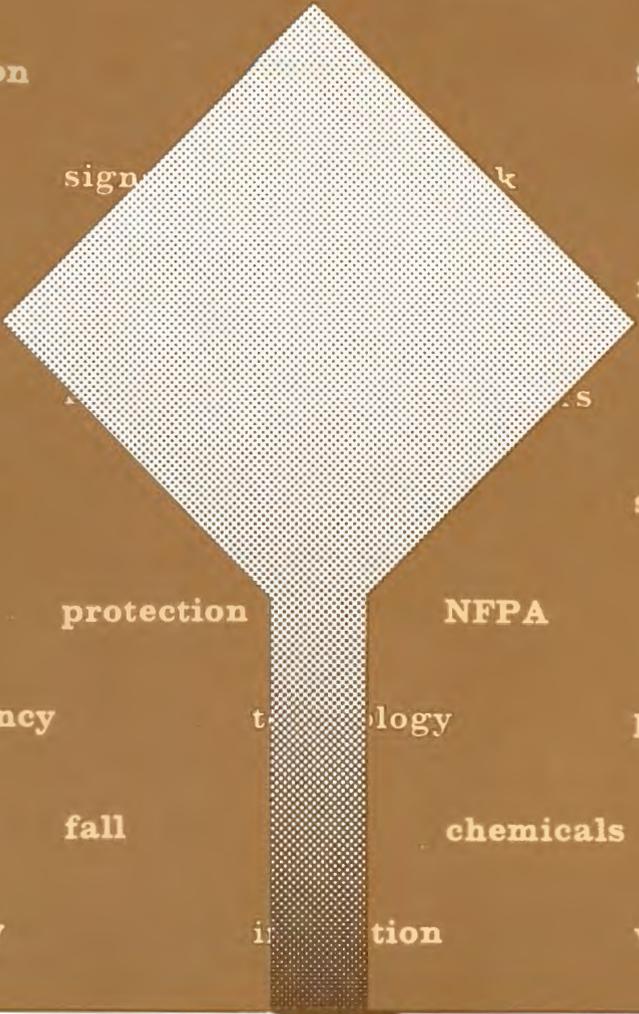


# Trends

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Chris T. Delaporte, Director  
Heritage Conservation and Recreation Service

John H. Davis, Executive Director  
National Recreation and Park Association

#### Editorial Staff

Heritage Conservation and Recreation Service  
Division of Park and Recreation Technical Services  
U.S. Department of the Interior

Frank C. Goodell, Managing Editor

James A. Burnett, Editor, *Design* and *Grist*

Nancy Blauvelt, Senior Editorial Assistant

Kathleen A. Pleasant, Editorial Assistant

#### Contractors to the Program

Maureen Palmedo, Consulting Editor, *Trends*, *Grist* and *Design*

Graphichouse Ltd., Design Consultant

District Lithography Company, Inc., Printer

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## INTRODUCTION

by Nancy Blauvelt

From the early 19th Century, with the inception of the Industrial Age, and down through the years, many marvelous things have come into existence: airplanes, electricity, automobiles, DDT and other "wonder chemicals," wash-and-wear clothes, and a host of items taken for granted today. These many new creations help us to keep warmer, eat better, dress more comfortably, reduce work, travel faster, and generally improve our lives and create more leisure time.

But, as new technology has benefited us, so too has it created its own set of problems and conditions. We now suffer from air, noise and chemical pollution of astounding proportions. Our airplanes possibly disrupt the ozone layer of the atmosphere. Our automobiles and the roads we drive them on cause noxious fumes and deadly particles for us to breathe and potholes which break wheels and cause damage. Time and labor-saving devices improperly used can result in injury, even death. Clothes that won't burn and don't need ironing cause kidney damage in children. The plants and chemicals that produce our energy, goods and materials also cause environmental hazards resulting in cancer, neurological diseases, birth defects, and other disorders.

Industry and technology are not alone in harboring unsafe working and

living conditions. Nature too will have its way. Exposure to the elements can produce hypothermia. Drownings occur in lakes, rivers, and streams. Burns often result from geysers and thermal features. Wild animals and sudden storms produce dangerous situations. Trails, cliffs and overlooks beckon the unwary too close to dangerous precipices. Recreational sports can maim, injure or kill. Adventurous excursions by the unprepared often end in tragedy.

Into this situation has stepped a newly skilled professional intent upon creating a healthful and safe work or play environment. That person may be a safety manager, an occupational health and safety specialist, an industrial hygienist, an engineer trained in structural design, a loss control specialist, a risk manager, a fire inspector or a person trained in a number of related skills.

The creation of this host of safety and occupational health specialty areas has been the result of a national call to conscience spurred by such legislation as the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1593). While this response has not been as overt as the mandate to reach the moon, it has been a slow, steady progression in problem recognition and problem solving that continues even today. The roots of the safety

"movement" were small at first as many questioned the need for a distinct safety management focus in an organizational setting. "Common sense" was all you needed according to early sages. But, we've learned that the high-technology, high-speed world in which we live demands a greater sophistication. Common sense can't prevail against the unseen or unknown danger. Someone must make us aware and help us take reasonable precautions and—yes—sometimes even protect us from ourselves.

The need for a specialized corps of safety and occupational health experts is clearly present in the parks and recreation field. City people in the country simply are unaware of the existing hazards of the natural or rural environment. Visitors at leisure don't have their guards up when relaxing on an outing with family and friends. People at play often are not as careful or attentive as they should be to potential hazards inherent in unfamiliar surroundings.

By the same token, our employees are often exposed to a wide range of hazards as they operate in park environments and offices. They must not only be constantly alert to their own well-being, taking all appropriate precautions in the form of available personal protective equipment and safe job techniques, but they must always think in terms of creating a safe atmosphere and maintaining an example for visitors to follow.

The articles in this issue of TRENDS will focus on the wide variety of potential hazards and safety problems that may be encountered in the park and recreation setting. It will deal with how to recognize and plan out as many of these hazards as possible, recognize those hazards that can't—or shouldn't—be totally eliminated, discuss potential areas of liability, and in general explore a topic that is fast reaching the top of the agenda in our field—a topic catapulted to the top by public attention and media coverage of the growing number of serious accidents.

Management at all levels is taking a quantum leap in its recognition of the need for progressive safety programs. "Be safe" is a message that is being heard and heeded.



## NPS Approach

by Leroy B. Spivey

Approximately 15 months ago when I joined the National Park Service as the Safety and Occupational Health Manager, I was informed that the results of safety evaluations conducted by the U.S. Department of the Interior and by the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor both implied that the management of the National Park Service devoted too much time to visitor safety and very little time to employee safety. As a major priority, the Division of Safety Management conducted a survey of safety and occupational health programs within the Service to determine whether these findings were valid.

The results of the survey were revealing. The findings of OSHA and the Department of the Interior were true; however, some extenuating and mitigating circumstances existed.

Using 1978 as a statistical calendar year base, 190 visitor fatalities and 2,483 visitor injuries occurred within the National Park System. At first glance this might appear to be an atrocious visitor accident rate. However, 283 million visitors were recorded by the National Park Service during that period of time. Thus, the accident frequency rate for 1978 was .067, which translates into one fatality per 1.5 million visitors.

Compared to other federal agencies that provide similar visitor services, the National Park Service has a much better visitor safety record. This record can be attributed directly to management emphasis on providing a safe and healthful environment for the visiting public.

On the other hand, during the same period 1,505 National Park Service employees were injured; 651 of these injuries resulted in lost time. The direct cost of workers' compensation for these 651 cases was \$1,401,785.00. This figure only includes the National Park Service's pro-rata share to the Department of Labor for the administration and logistical support of the National Workers' Compensation Program.

When you incorporate the costs for continuation of pay, for replacement or reparation of vehicles and equipment, for structural or property damage, and tort claims resulting from the acci-



*NPS Safety staff discuss Safety and Occupational Health programs.*

Connie Villar

dents, the figure of \$1,401,785 jumps to approximately \$5,000,000.

A prime reason for this employee accident record is the rapid expansion of the National Park System from its original 13 natural areas in 1916 to its current 320 units which include national parks, national historic sites, battlefields, monuments, national seashores, lakeshores, recreation areas, and parkways. Accompanying the rapid expansion of the park system were the requirements, new developments, increased engineering activities, increased maintenance responsibilities, increased ranger activities, expanded cultural and natural resource programs, and the inheritance of aged, unsafe, and unhealthful facilities in our urban park acquisitions. All of these conditions have contributed significantly to the employee accident/incident rate as they increased the exposure of our park employees to unsafe and unhealthful working environments.

The OSHA standards provide the existing criteria for the evaluation and inspection of employee work environments. These standards primarily are directed toward unsafe or unhealthful conditions. However, when you evaluate employee accident statistics on a national level, you discover that less than 20 percent of all recordable employee injuries can be attributed directly to unsafe or unhealthful conditions.

What this statistic implies is that approximately 80 percent of all employee injuries could be reduced significantly through comprehensive and aggressive safety and occupational health programs—programs in which safety and occupational health responsibilities are considered an integral part of the managerial system and not as means unto an end in themselves.

To support this concept within the federal government, the Department of Labor published 29CFR Part 1960, which required all federal agencies to

*Park employees must be properly equipped for rescue missions in backcountry areas in all types of weather.*

establish a comprehensive system of safety and occupational health management. It largely has been due to that edict, the OSHA laws, and Presidential Executive Order 11807 that most federal safety programs have received their current emphasis and managerial support.

### **Park Safety Problem Areas**

Before discussing the development and implementation of this type of safety and occupational health program, let us address some of the complex problems that confront park managers.

- *Natural Hazards.*

Many park areas contain such natural hazards as cold lakes, rapidly flowing rivers, wave and tidal activities, mountainous terrain, rugged backcountry, extreme climates, and dangerous wildlife. Within these naturally hazardous environments, park visitors may engage in activities which also may be hazardous, such as swimming, boating, water skiing, fishing, climbing, hiking, snow skiing, tubing, sightseeing, and backcountry activities. Because of hazards associated with these environmental features and recreational activities, park visitors often assume risks. Some of these risks end up in unpleasant experiences or accidents.

- *Modern Technology.*

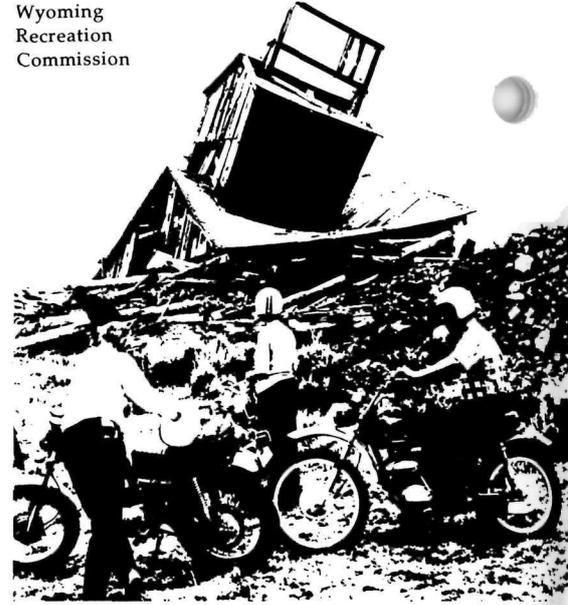
In addition to the natural hazards, park systems are being invaded by modern technology. In the early days of the National Park System, the environment was relatively slow-paced with the typical park visitor coming to sightsee and to enjoy the beauty and tranquility of the park resources.

However, today, because of the increase of leisure time and the increasing accessibility of most park locations, parks are undergoing a future shock syndrome. Items such as high-velocity speedboats, motorized water skis, hang gliders, trail bikes, motorcycles, snowmobiles, remote-controlled model airplanes, and recreational vehicles—

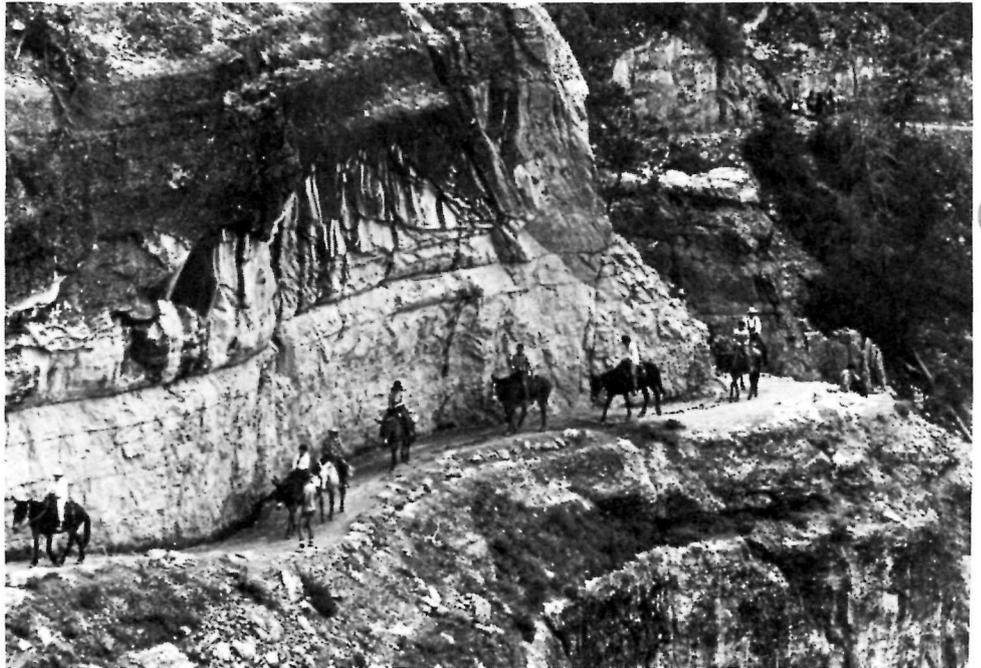


NPS

Wyoming Recreation Commission



*Trail bikes give easy access to old mines and create new hazard opportunities.*



*Concessions must meet established standards to insure visitor safety.*

NPS

all of which utilize technological advancements—have increased accidents and incidents in parks significantly.

- *Congestion.*

As park systems expand and the visiting public has more leisure time, overcrowded conditions present many safety and occupational health hazards. Parkways that once served as sightseeing routes through beautiful countryside near major urban areas, gradually have been converted to ex-

tensions of state and county commuter routes. As a result, park systems are charged with responsibility for traffic accidents that are virtually impossible to control.

The increasing number of visitors driving to various parks has generated traffic congestion problems which often result in motor vehicle accidents within the park environments. Lack of adequate parking areas also contributes to the growing number of fender



Age and condition of many structures in a park environment make fire protection and suppression a major managerial problem. NPS

First-aid training for employees is an essential part of a park safety plan. NPS



Natural hazards such as this rattlesnake exist in many park areas. NPS



An Industrial Hygiene Specialist demonstrates use of airgrab sampler. Bill Davis NPS



Appropriate safety equipment significantly reduces on-the-job injury. NPS

benders. When you mix the increased number of pedestrians in a park system with the increase in motor vehicle activity, the end result is an inevitable increase in injuries associated with motor vehicle accident/incidents.

• *Aged Structures and Facilities.*

In many park systems, existing buildings and other facilities have become old and, in some cases, hazardous to both the visiting public and park employees. To bring these structures and facilities within minimum safety standards as prescribed by OSHA and the National Fire Protection Association (NFPA) "Life Safety Code," massive maintenance and redesign efforts must be undertaken at astronomical costs. Unless adequate budgetary programming is accomplished, most park systems are not financially prepared to deal with this problem.

• *Fire Protection and Suppression.*

Because of the age and condition of many structures in a park environment, fire protection and suppression is a major managerial problem. Criteria set forth in the OSHA standards and the NFPA codes place many restrictions on existing park development. The cost of an adequate fire protection and suppression program is staggering. And, in many cases, appropriate fire protection actions conflict with existing cultural resources policy and programs.

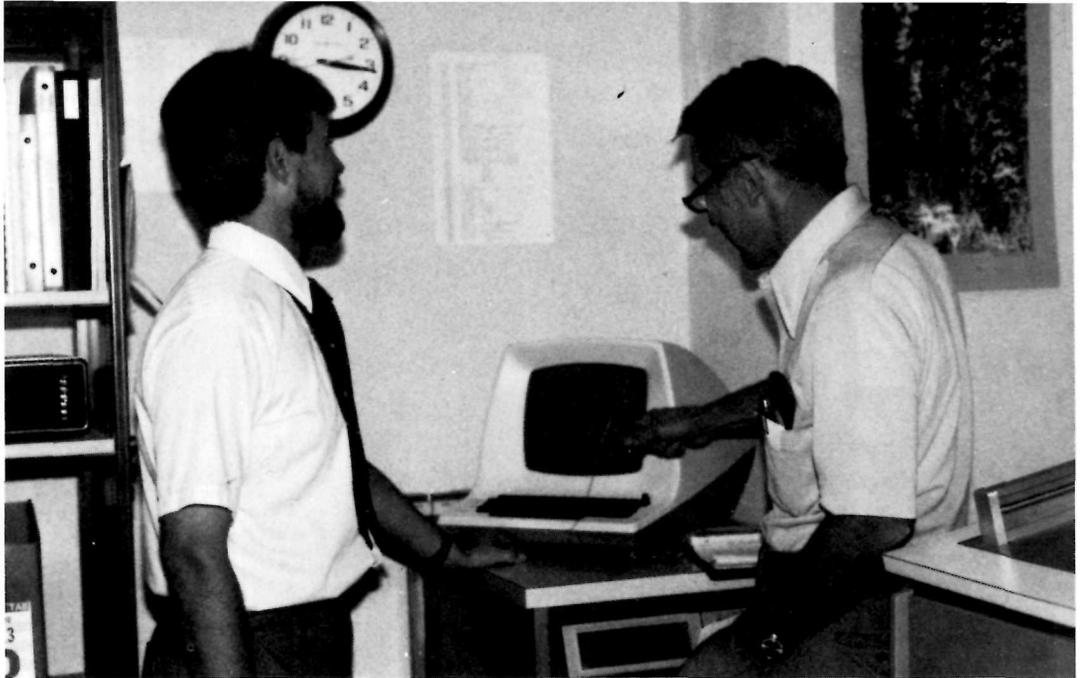
• *Industrial Hygiene.*

In today's park environments, employees are exposed to countless industrial hygiene hazards, such as toxic chemicals and materials, excessive noise, dust, and other biological conditions which, over a long term, can lead to occupational illnesses and diseases. This is an area of safety that has received very little attention.

• *Employee Awareness.*

For many years, safety and occupational health programs have been received very negatively by the employee work force. This is due primarily to the perception and support of safety programs by management in the past. Until 1970, there were no requirements

*NPS' Safety and Occupational Health Program includes computer data base for more efficient record-keeping and reporting.*



Connie Villar

for management to inform employees about their work environments from a safety and occupational health point of view. By the provisions of the OSHA laws, 29 CFR Part 1960, and Presidential Executive Order 11807, mandatory safety and occupational health training criteria now have been established and made available to employees. Consequently, employees are becoming more and more aware of their rights and responsibilities under the OSHA Act.

• *Concession Facilities.*

Concession facilities have had to expand to accommodate increased park visitation. To ensure that these facilities meet existing safety and occupational health standards, park managers must conduct necessary safety and occupational health evaluations and inspections. In addition to the inspection effort, appropriate follow-up actions are required to eliminate those hazards that expose employees and the visiting public to unsafe and unhealthful conditions.

• *Managerial Support and Budgeting for Safety and Occupational Health.*

Most safety and occupational health programs fail because of inadequate support from top management and lack of programmed funding. Unless the safety and occupational health function is considered to be an integral part of the management system and is budgeted accordingly, the program only can be considered reactionary. When top management supports the function, the program can assume a posture that will reduce accidents and

injuries in park environments significantly.

There are many other problems affecting the management of safety and occupational health. However, if the above problem areas are approached in a systematic managerial manner, a productive and successful safety and occupational health management program can be implemented.

**Aggressive New NPS Program**

In 1978, the National Park Service revised its approach to safety and occupational health management. It positively identified safety as an integral part of the reorganized management system. Many managerial functions that had not been clearly identified were added to the Safety and Occupational Health Management Division. The accompanying chart outlines the present functional responsibilities of the Division.

To adequately support its expanded safety functions and to comply with 29 CFR Part 1960, Executive Order 11807, and Department of the Interior Manual 584, the National Park Service committed itself to the development and implementation of a comprehensive 3-5 year Safety and Occupational Health Program. In addition to fulfilling all existing statutory and regulatory requirements, the program will be designed to meet the complex needs of the Service.

Since this will be one of the most comprehensive programs of its kind, other park and recreation agencies

might be interested in knowing some of its details. Specific elements addressed within the program are:

1. Employee Involvement
2. Executive Support and Duties
3. Safety and Occupational Health Staffing and Functions
4. Operating Management and Supervisory Responsibilities and Duties
5. Safety and Occupational Health Standards Adoption and Compliance
6. Safety and Occupational Health Training Activities
8. Record-keeping and Reporting Procedures
9. Promotional and Interagency Activities
10. Safety and Occupational Health Evaluation Procedures
11. Visitor Safety and Occupational Health

**Administration and Logistical Support**

The budget formulation process for Fiscal Year 1981 is being revised to include provisions for adequate funding of National Park Service Safety and Occupational Health Program requirements. By setting up a line item in the budget process for safety and occupational health requirements, the National Park Service will be able to maintain an adequate record of all major programmed requirements and expenditures.

The line item for safety and occupational health will provide direct funding for the administration and logistical

support of the Service's Safety and Occupational Health Program. Elements included under this funding are:

1. Salaries of all assigned professional safety and occupational health staff and direct support personnel.
2. Appropriate salaries of collateral duty safety officers based on 20 percent of their duty assignment being devoted to safety and occupational health responsibilities.
3. Travel.
4. Training for all safety and occupational health staff, including collateral duty safety personnel.
5. Research and special emphasis programs.
6. Appropriate publications and other reference materials.
7. Logistical support, such as supplies, furniture, and special equipment.
8. Printing and graphic support.
9. Inspections and investigations.

Additional safety and occupational health funding will be programmed for within the following organizational functions: maintenance management; construction; concessions management; interpretation and visitor services management; ranger activities; cultural resources; and youth activities.

#### **Employee Involvement**

Increased employee involvement in safety and occupational health matters will be encouraged in a number of ways. A system will be established whereby National Park Service employees can report unsafe or unhealthy conditions observed in their work environment. A National Park Service Awards Program will provide recognition at the regional and park levels for significant accomplishments in safety and occupational health. The awards program also will identify the region that has the best safety and occupational health program.

All National Park Service safety and occupational health committees will be revised to ensure adequate representation of management, supervisors, employees, and laborers. Revised committee responsibilities and duties will require more active participation by all members. In addition, a safety and occupational health orientation brochure

will be published, outlining the duties and responsibilities of all Service employees. Finally, a management information system will be developed to provide timely information to all employees concerning safety and occupational health programs and special projects.

#### **Executive Support and Duties**

In compliance with the requirements of 29 CFR Part 1960, safety and occupational health committees will be established in the National Park Service's Washington office and at regional headquarters. Also, a new Safety and Occupational Health Management Policy, consistent with the parameters of the newly developed programs, will be formulated.

#### **Safety and Occupational Health Staffing and Functions**

A senior industrial hygienist will be added to the Washington office's safety staff. This industrial hygienist will develop programs and policy to meet the occupational health requirements of the National Park Service. Also, the Washington safety office will provide technical assistance and consultation to all NPS organizations concerning occupational health.

A standardized regional safety organizational structure will be developed to include an appropriate career ladder program that will allow personnel within the established system to obtain required training and also give them the opportunity to advance to management levels. A comprehensive collateral duty safety officer program also will be developed.

#### **Safety and Occupational Health Standards Adoption and Compliance**

The National Park Service has adopted OSHA and other national consensus standards. The major new effort in this area will be to incorporate safety engineering into the material acquisition cycle.

A special emphasis program will ensure that the Service conducts timely reviews of plans, designs, specifications, and contracts from the design or acquisition stage to the disposal stage. Implementation of this program

should save the Service millions of dollars in unnecessary modifications in our maintenance and construction programs.

In all standards adoption and compliance matters, a strong inspection program will be our key to success.

#### **Safety and Occupational Health Training Activities**

Major efforts will be made to incorporate safety and occupational health training into the ongoing programs at Mather Training Center, Harpers Ferry (WV) and at Albright Training Center, Grand Canyon (AZ). In addition, a Safety for Line Managers course will be developed and conducted at the Mather Training Center. It will be a 32-hour course emphasizing accident prevention.

A series of safety management seminars will be presented to our Washington office executives and managers to satisfy 29 CFR Part 1960 as it pertains to safety training for top-level managers. Members of regional safety staffs will continue to develop their skills by attending professionally oriented safety training courses.

#### **Inspection and Hazard Abatement Procedures**

Emphasis will be placed on getting collateral duty safety officers more involved in safety and occupational health inspections. Training them in proper inspection techniques will be crucial.

A directive and guideline will be published on these procedures and a special emphasis program will provide further direction in inspection and hazard abatement requirements for concessions operations.

#### **Record-keeping and Accident Reporting Procedures**

During the first six months of Fiscal Year 1979, the Washington office Division of Safety Management completed an analysis of visitor fatalities for calendar year 1977 and the first six months of 1978. A computer data base has been established; future plans call for the utilization of a Special Program for Social Sciences (SPSS) to conduct

inferential statistical studies. The computer program will become a part of our Safety and Occupational Health Management Information System.

An upgraded accident investigation and reporting directive and guideline will be developed. Future plans will include computer software packages that will provide timely analytical accident prevention data to the field. Meanwhile, a more comprehensive board of inquiry program for the National Park Service will be established.

### Promotional and Interagency Activities

Timely and effective safety and occupational health programs will be conducted in concert with the National Safety Council, the Office of Federal Agencies' Safety Programs, and the Department of the Interior. To upgrade the professional image of the safety function within the National Park

Service, the Washington office Safety Division will publish special emphasis programs directed at special safety and occupational health problems.

### Safety and Occupational Health Management Evaluation Procedures

Commencing the second quarter of Fiscal Year 1980, a team from the Washington office Safety Division will visit regional headquarters and conduct evaluations based on the published eleven elements of the Safety and Occupational Health Program. These evaluations will provide data on how well the regions are meeting their responsibilities. Regional safety managers will conduct similar evaluations of parks under their jurisdiction.

Regular safety and occupational health inspections will be conducted in the parks by park safety officers, collateral duty safety officers, safety committees, and first line supervisors.

The Washington office and regional safety staff will provide technical assistance and consultation to the parks as required.

### Visitor Safety and Occupational Health

All safety staff members of the National Park Service will incorporate their efforts vigorously within the Director's "Year of the Visitor" program. Successful accomplishment of the program areas described above and of our special emphasis programs will virtually ensure a significant reduction of visitor accidents and injuries.

### Special Emphasis Programs

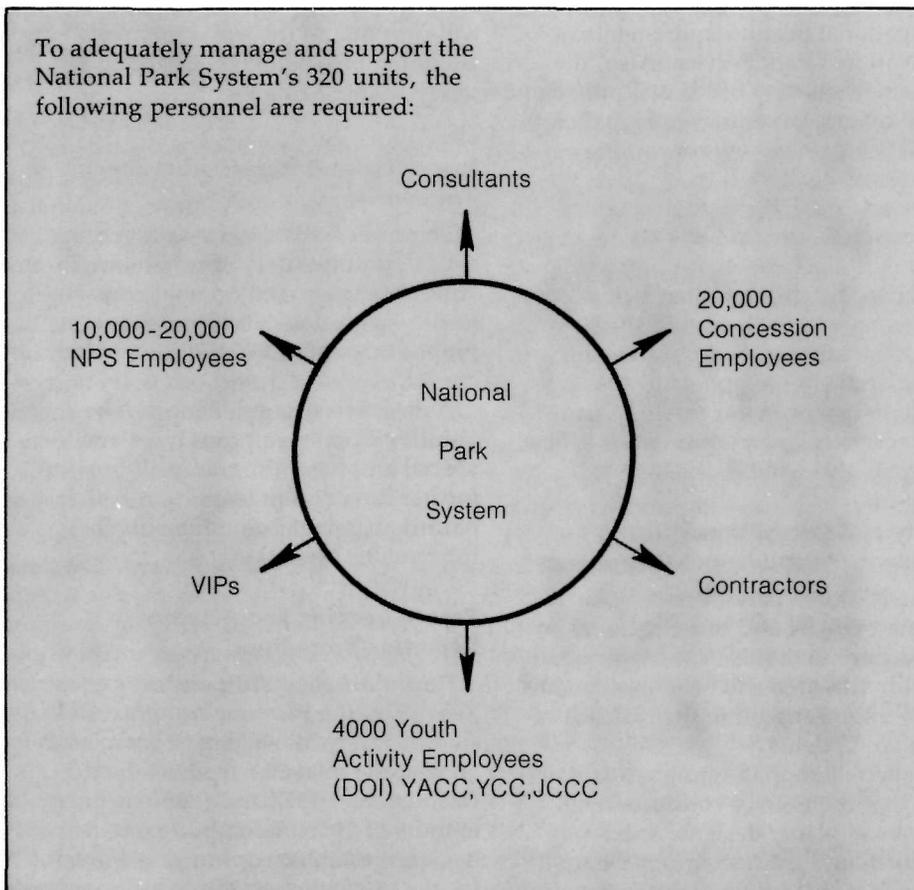
In addition to the efforts described above, the following special emphasis programs have been planned for Fiscal Year 1980:

1. Motor vehicle and industrial equipment safety program
2. Structural fire protection and suppression program
3. Special safety and occupational health program for historic structures
4. Comprehensive cave radiation safety program
5. Personal protective equipment program
6. Publication of NPS standards and guidelines for a number of commonly used toxic chemicals

Through this far-sighted Safety and Occupational Health Program, implemented by sound and aggressive management principles, we expect to reduce significantly both visitor and employee accidents and injuries within the National Park System. Other park and recreation managers might follow some of these ideas too, for the principles behind this program can be applied to just about any park system.

*Note: Anyone desiring further information or details about the National Park Service Safety and Occupational Health Program is invited to contact Mr. Spivey at the National Park Service, Division of Safety Management, U.S. Department of the Interior, Washington, DC 20240.*

*Leroy B. Spivey is Chief of the National Park Service Division of Safety Management.*



# Planning and Design for Safety and Emergency Provisions

by Monty L. Christiansen



Water areas may be hazardous if they are deep, turbulent or too cold.

NPS

Park planners are becoming more aware of the safety and emergency factors that must be studied as an inherent part of the planning and designing process. It is difficult to suggest a uniform national safety standard for park development. Too many variables must be considered: type of activity, extent of park development and environmental modifications, as well as user preparation, previous experience, and expectations. But it is possible to identify several major planning considerations that are important to park visitors' safety.

An accident can be defined as an unplanned event involving personal injury and/or property damage caused by an unsafe act or by a hazard. An unsafe act is a personal action that directly causes or permits an accident to occur. A hazard is a physical or environmental condition which may cause or lead to an accident. With good planning, most hazard-related park accidents can be prevented.

## Park Hazards

There are three predominant types of hazards that may cause accidents in a park: unsafe or improper equipment, unsafe environmental conditions, and unsafe development of facilities.

Examples of unsafe equipment hazards include broken or improper personal sports and recreation equip-

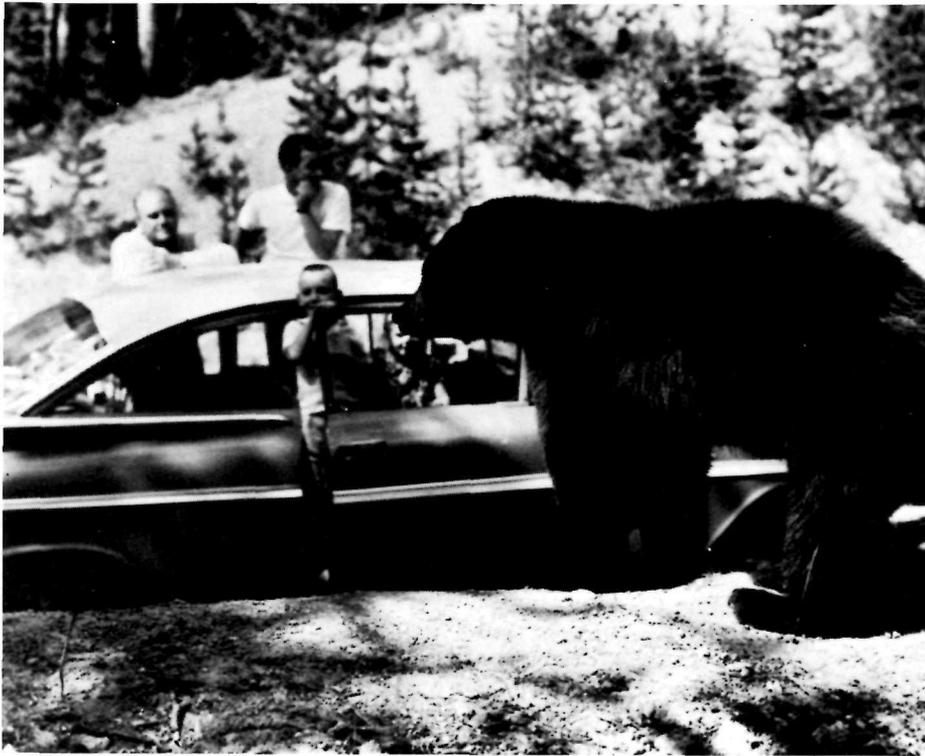
ment, attire, footwear, vehicles, and other apparatus. Other than enforcing regular inspection regulations for boats, snowmobiles, bicycles, trail bikes, campers, and other similar equipment, most park agencies have

little control over these potential hazards. The other two types of hazards, however, are important considerations for park planners.



Dangerous areas should be properly marked with explanation of hazards.

NPS



Visitor safety can be threatened by wildlife.

NPS

*Environmental hazards* are natural conditions which can be dangerous to park visitors. Fall hazards include cliffs, banks, rock slide areas, open shafts and caves, and other areas where people may climb. Water areas may be hazardous if they are deep, turbulent, or too cold. Grass and forest lands are susceptible to wildfire. Trees may fall. Wildlife may attack park visitors. It would be impossible to list all the possible natural hazards found in parks where people might fall, drown, or otherwise injure themselves.

*Park development hazards* include all unsafe facilities, apparatuses, walks, steps, buildings, and other structures and developments. It's ironic that the facilities developed to accommodate park visitors are the most frequent site of park accidents.

Many accidents caused by these two types of hazards—unsafe environmental conditions and park development hazards—can be prevented by good planning and design. In addition, it is important that park planners incorporate appropriate provisions for emergency services in the design phase of any new park.

### **Environmental Hazards**

Park planners need to utilize the knowledge and skills of trained safety specialists in all phases of park planning to insure satisfactory hazard control. As part of a site analysis, all natural safety hazards should be inventoried, sited on base maps, and appraised according to their severity and their impact upon proposed use of the area, its activity patterns, control requirements, and budget.

There are three important planning tools which can be used in this pre-development environmental hazard appraisal. The first is park land-use zoning. When park use zones are established from natural resource determinants or requirements for specified activities, it is possible to utilize the natural conditions of the park most effectively and efficiently. By transposing this activity land-use zoning over the base inventory map of natural hazards, a potential user/hazard conflict factor can be determined.

Another tool in preparing the environmental hazard inventory is park safety zoning. Safety zones may be established according to predetermined recreational activity risk categories and the location, extent, and severity category of the natural existing hazards. This process is relatively new, but could become a great aid for park planners. Further discussion of this concept appears in the article "To-

wards a System for Evaluating Visitor Safety Programs in Parks," by W. W. Davis in this issue.

A third tool used by park planners which has important safety implications is an experience criterion for park visitors and users. This is actually a series of development and resource modification standards which help define the level of user support facilities and services to be provided.

Many planners use a five-level planning range of outdoor recreation experiences for resource-oriented activities. An example of this is camping: "Primitive camping opportunities" usually require a high level of outdoor skills. The natural environment is dominant at the campsite. Campers "accept nature on its terms," including hazards. This relationship between camper and the environment is gradually modified as camping opportunities are provided at the various other levels of experience/environmental modification norms until, at the fifth level, "modern camping opportunities" provide a secure situation where personal comfort, convenience, and safety are predominant and site modification may be high.

These planning tools, separately or in combination, help determine which environmental hazard control alternatives should be used for each situation. Hazard control alternatives may range from immediate removal of the hazard, to site modification to reduce the severity of the hazard, restrict access, or otherwise protect the park visitor, to such administrative procedures as the establishment of policies, regulations, and intensified enforcement, or visitor awareness programs. Working with safety specialists, designers, managers, and others, the park planning team can recommend the most satisfactory ways to control the indigenous natural hazards in a park.

### **Park Development Hazards**

Most park accidents do not occur in the backcountry or undeveloped portion of a park. In fact, mishaps to visitors commonly occur within the developed portions of a park. Some are caused by unsafe or careless acts by the park visitor, others are the result of park development hazards. Preventive measures taken in the pre-design, de-

sign, and development phases of park planning can greatly reduce the likelihood of serious accidents caused by physical hazards. These measures must be supplemented by regular safety inspections, maintenance, and repair of park facilities and use areas.

The most common park hazards in developed areas are probably:

1. *Structural inadequacies* such as weak railings, slippery or unstable surfacing, incorrect or faulty hardware, and weak or damaged weight-bearing structures.
2. *Poor visibility* for personal safety, caused by daytime visual obstructions or insufficient artificial lighting at night.
3. *Inadequate barrier or control restrictions* at inherently hazardous situations—for example, no guard fence or wall atop a high precipice or overlook, an unfenced pool, accessible high-voltage transmission lines, unsecured electric transformers, gas valves, and flammable liquid storage facilities.
4. *Circulation obstacles* such as low clearance or narrow walkways, unnecessary steps, poorly marked or blocked exits, and equipment storage located in the emergency circulation routes.
5. *Insufficient fire prevention*—for example, no control of smoking or other ignition sources in fire-susceptible locations, improper installation of electric wiring, omission of lightning arresters, dangerous storage of flammable and combustible materials, and disregard for fire-resistant construction.

### Physical Provisions for Emergency Situations in a Park

Every park and recreation area should have a well-prepared park emergency plan. The plan must be specifically related to each park—activities provided, size of the park, number of people using the park, proximity to public hospitals, fire stations, police and other emergency services, and probability of natural disasters that would require special considerations.

The first objective of a park emergency plan should be the safety and protection of park visitors and employ-



Helicopter is being loaded with fire-fighting equipment.

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ees, including immediate assistance to injured individuals and removal of others from danger. Next, protection of all property must be considered. Finally, the preservation or restoration of park services and operations must be included in an emergency plan.

The emergency plan must be responsive to a variety of situations. It is just as bad to overreact or to take improper steps as to be unprepared in an emergency. The type of park emergency is determined by four factors: (1) the impact on people, (2) the impact on property, (3) the need for immediate, interim assistance, and (4) the impact on program.

Preparation of a park emergency plan requires consideration during several phases of the park planning process. The predesign activity analysis helps identify possible emergency situations. The design directive, including agency specifications, directs the physical development of a park to have emergency access, safety routes, first aid, and fire fighting provisions. Following park development, personnel training, facility inspection, and careful emergency procedures must be implemented as part of the plan.

There are two principal components to the park emergency plan: the physical provisions for an emergency in the park and an established strategy for emergency procedures. These compo-

nents must be coordinated. This requires that the plan be a collaboration between the safety specialist, park designer, administrator, line supervisor, and the local emergency service agencies.

Park planners must include emergency support in the physical development of a park. Four considerations are essential to park emergency support provisions: emergency communications, emergency circulation including access routes for emergency vehicles and personnel evacuation routes, and two interim assistance provisions—first aid and fire fighting.

### Emergency Communications

Emergency communications are essential in emergency situations to help locate emergency support services or apparatus, to alert others who may be endangered, and to summon assistance.

Signs or other graphic devices that identify exits, alarms, telephones, first aid or medical aid stations, building fire extinguishers or standpipes, or

other emergency provisions should be prominent, understandable and well illuminated.

*Alarms* are essential for park structures or areas of public occupancy where immediate, orderly evacuation could save many people from danger. Remote alarms are essential for vital park structures and utilities that may be unmanned during long periods of the day. Combination alarms often are installed in community centers, information or exhibit centers, gymnasiums, or other program facilities that may be closed and unoccupied at times.

A public address system frequently is required by local or state building codes for areas of public assembly where large numbers of spectators gather. Examples in parks would include field houses, performing arts theaters, amphitheaters, stadiums, or other meeting halls where emergency announcements must be heard over noisy activities, as well as public beaches, pools, skating rinks, bowling alleys, gymnasiums, dance halls, and cafeterias.

The means to summon emergency assistance, such as alarms or telephones, should be accessible to the public in all major park program structures and areas. These should not be kept in locked rooms or compartments. Clear directions and emergency numbers should be prominently posted by the alarm or telephone.

### Emergency Circulation

There are two aspects to consider when mapping the emergency circulation patterns of the park: park visitor and employee evacuation routes and access corridors for emergency vehicles—ambulances, fire trucks, tow trucks, and other specially equipped units.

*Evacuation routes* are designated ways to leave a structure or area of immediate danger. Any park program or support facility having an anticipated occupancy of at least one person per one hundred square feet (9m<sup>2</sup>) should have designated emergency evacuation routes. Examples include open-air am-

phitheaters, stadiums, pavilions, festival grounds, plazas, skating rinks, swimming pools, and beaches. The evacuation routes for each facility should provide a continuous and unobstructed exit to a place of safety.

The width of each evacuation route is based upon the capacity of the facility or area it serves, the total number of routes, and a necessity for steps or ramps. For each program unit, a minimum of two evacuation routes should be provided, remote from each other to insure an alternative way to leave if one route should become unusable. Occupants of these facilities should not be more than 100 feet (30 m) from an evacuation route at any point in the structure or area.

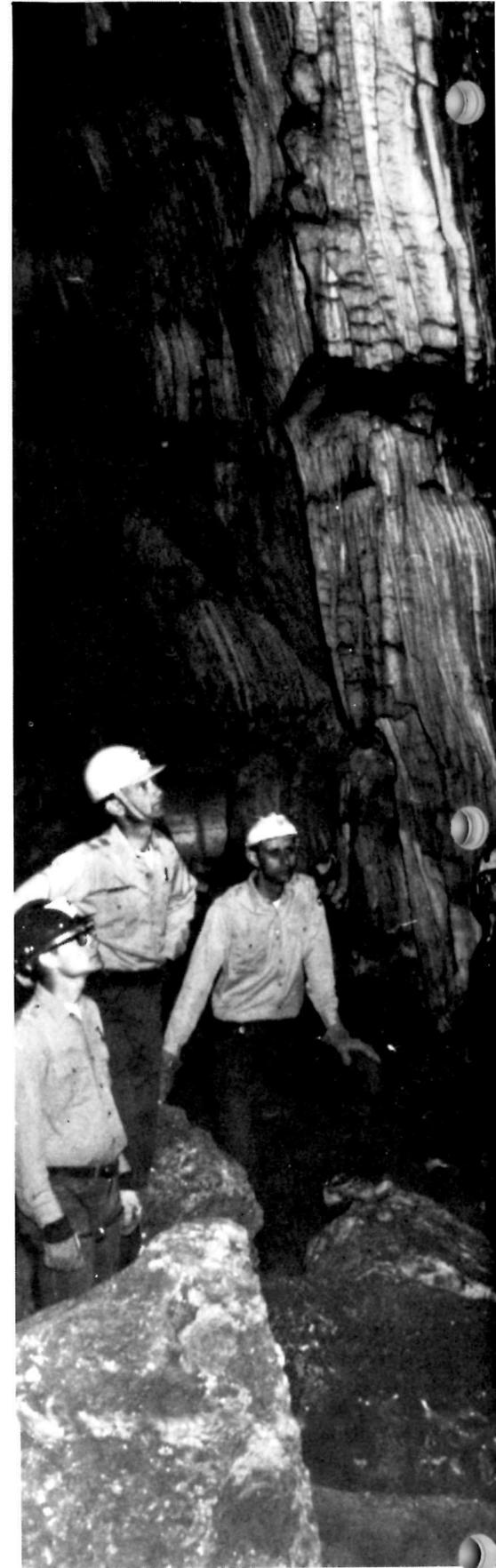
Park evacuation routes provide safe and rapid movement from a facility; park *emergency aid access* routes provide convenient and rapid movement to a facility for those responding to an emergency situation. The three most frequent assistance requests in a park may be for an ambulance, for a law enforcement officer, and for fire fighting equipment. Direct vehicular access to fire hydrants and one or more facility entrances is necessary to save essential time in the removal of ill or critically injured individuals, to stop potentially dangerous disturbances, to assist in rescue operations, and to control and extinguish fires.

Local fire marshals, insurance carriers, and fire company officials should be involved in the planning of park buildings and water systems. Each emergency agency servicing the park should be familiar with all access routes, procedures, and park emergency facilities.

### Interim Fire Control

A well conceived park fire protection plan includes provisions for both professional fire fighting services and supplementary interim fire control. Fire hydrants, standpipes, water supply, emergency communications, and access routes are essential elements of a park fire protection plan.

Another important element of this plan is a system of portable fire extinguishers to control fires in the early stages of development. The selection of fire extinguishers should be based upon the class of fire most apt to occur,



*Provisions for emergency rescue in accessibly difficult locations must be included in park safety plans.*



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the type of building construction, occupancy content, hazard rating, ambient temperature conditions at the extinguishers' storage locations, service area of each extinguisher, strength, agility, and training of possible operators, extinguisher recharge, test and maintenance service availability, and other standards prescribed by local fire codes.

The number of fire extinguishers needed is determined by the severity of the hazard, anticipated degree of spread, fire intensity, and accessibility. The size and placement of the extinguishers should be determined by a competent fire safety specialist.

### **Park First Aid and Emergency Dispatch Provisions**

There are two principal components to a park emergency treatment service: (1) first aid, and if necessary, (2) transportation to appropriate medical facilities that have competent physicians.

The first aid responsibilities and roles required of park and recreation agencies have not been well defined in the past. There are two legal liability facets for first aid in such situations—the duty to administer first aid and the responsibility for administering first aid appropriately and properly. Convenient and prominently identified first aid provisions should be located in every major public park facility such as swimming pools, beaches, skating rinks, gymnasiums, recreation centers, outdoor education centers, firearms ranges, and sports complexes. The first aid supply should never be spread throughout the facility but should be kept together, under the control of designated trained personnel.

A personal first aid kit is logical required equipment for recreationists using backcountry areas where self-reliance is necessary. It is the policy of many park agencies to require all organized groups that have been granted exclusive use of an area or facility to provide their own first aid provisions including qualified first aiders.

### **Emergency Dispatch Provisions**

Casualties should not be placed hurriedly in the first available vehicle and rushed pell-mell to a hospital. On the contrary, they should be held at the

scene of the accident until adequate emergency care has been rendered by qualified personnel and they have been made ready for transport. Emergency dispatch instructions should be prominently posted at every first aid station, on every first aid kit, and displayed at every emergency communications facility.

There are several park accident situations where it is impossible for an ambulance to directly approach the injured party for evacuation. Many of these situations are predictable and must be considered in the park emergency plan. Examples include accidents on ski slopes where the National Ski Patrol must use casualty sleds and snowmobiles to bring injured down to a designated receiving area because ambulances are limited to cleared roadways and parking lots, water accidents at beaches or as a result of a boating or water skiing accident where lifeguards, Coast Guard, or other water safety patrols must use floats and stretchers to bring injured to an ambulance zone, or where search and rescue teams have to bring out casualties from rugged backcountry. The probability of accidents occurring in these and similar park settings which are inaccessible to an ambulance is sufficient to require preparation of appropriate emergency physical and procedural provisions for these contingencies.

Park planners must incorporate these safety and emergency provisions in their physical and administrative plans for the welfare of recreationists and employees in park areas. These considerations are both preventive and reactive. While hazard control and safety planning attempt to prevent accidents, contingency support facilities, procedures, and personnel training for emergency situations are also essential parts of a park plan.

*Monty L. Christiansen is Associate Professor of Recreation and Parks at The Pennsylvania State University. This article is based upon a chapter of his recent book, Park Planning Handbook.*

## Risk Recreation: Philosophical Issues

by Joel F. Meier, Ph.D.

Kayakers running whitewater through deep river canyons, mountain climbers traversing crevasse-filled glaciers, scuba divers exploring uncharted reefs, hang gliders soaring high overhead—just thinking of the thrill and excitement of these ominous outdoor encounters causes adrenalin to rush through our veins. Some of us view these activities as a challenge and welcome relief from daily routines, while others prefer to leave such “risky” adventures to the strong at heart.

Other exciting recreational activities might include spelunking, hot air ballooning, sky diving, alpine and nordic skiing, winter camping, surfing, dirt biking, auto racing, and snowmobiling. Labels frequently used to describe programs which incorporate many of these events include “thrill sports,” “natural challenge programs,” “rugged recreation,” “high adventure activities,” and “outdoor pursuits.” Unfortunately, the term “risk recreation” is also often used, even though this term bears many connotations which create differences in judgment as to whether or not an activity actually provides exposure to physical danger beyond reasonable limits.

The expanding number of participants engaging in such a wide variety of high adventure leisure pursuits prompts observers to ponder the forces which cause such a phenomenon. The popularity of these activities within the last decade also has made park and recreation professionals more aware of a demand for activities which have elements of challenge, thrill, stress, and adventure.

But, while park and recreation professionals in the public sector have become aware of this demand for adventure and risk in recreation activities, they remain somewhat reluctant to sponsor them. This reluctance seems to be due to several factors, including the limited number of qualified activity leaders, misunderstandings about the extent of danger or actual risk involved in specific activities, a general lack of knowledge regarding the needs, values, and purposes of high adventure



*People increasingly seek to test their limits through self-imposed obstacles.*

Mike Sanderson

recreation programs, and worry over potential legal liability problems. In addition, park and recreation resource managers are confronted with problems of ecological impact and intergroup conflict typical of traditional outdoor pursuits as well as challenges of search and rescue, questions of legitimacy, and issues concerning appropriateness of management response.

Primarily because there appears to be a high degree of potential danger, many public recreation and leisure service agencies tend to allow only those traditional activities and events which are considered safe. The results

of one recent study revealed that the majority of responding public recreation agencies believed they should not provide risk activities. We should realize that without some risk activities, much of the excitement and fun is eliminated from our potential services. And we stand the chance of being labeled too soft, too dull, and too ordinary.

Do not the participants' desires for these opportunities represent a legitimate expression of needs by certain sections of our society? Is it not likely that many of our leisure service agencies are not meeting the needs and interests of the people they should

serve? Are we not forcing many potential participants to seek recreation excitement in locations where adequate supervision, instruction, and equipment are not provided? If so, are not the overall dangers of risks for the participants heightened because of this?

It is important that park and recreation resource managers realize that the growth of adventure recreation is real, and that those who seek such activity will continue to make increasing demands on us to accommodate their tastes. Before we can decide whether or not to allow this activity in public parks and recreation areas we need to know as much as possible about the subject. This includes: (1) an adequate conceptualization of the term "risk recreation," including an understanding of the inherent danger associated with related activities; (2) an understanding of the needs and values of risk recreation, including the reasons people engage in such activities and the place these programs have in our society; and (3) knowledge of implications regarding responsibilities of public agencies providing programs and opportunities for risk recreation.

### Defining Risk Recreation

As already mentioned, the term risk recreation bears many connotations. Individuals differ in their judgments of whether or not an activity is threatening. Risk recreation may be initially defined as any recreation experience characterized by a higher-than-average probability of injury or death to the participant, where the exposure to such a risk is an important component of the experience.

Risk-taking is influenced by an evaluation of the odds or probability of injury. For instance, it is possible to generate statistics on the number of injuries per number of participants (or per hours participated, per user days, etc.) for a given activity, and thus obtain an objective measure of risk. If the objective measure of risk is low in a specific form of recreational activity, this means there is a high probability of avoiding injury.

Some activities which are actually quite hazardous may be viewed as relatively safe; conversely, the objective measure of risk may actually be quite low for an activity which is perceived

as having high risk. Obviously, using a subjective rather than an objective basis for evaluating risk can lead to erroneous conclusions.

For example, free-fall parachuting (skydiving) often is perceived subjectively as risky, but from an objective standpoint it is not as dangerous as it looks. It produces a large number of scrapes and bruises but results in only one fatality per 70,000 jumps. This is a relatively low figure of objective risk. Skydiving is frequently classified subjectively high in risk because the probability that an accident will be fatal is extremely high. Thus, the subjective value placed on the consequences of the accident, the "stakes," imbue the activity with risk.

In comparison, the objective measure of risk for skiing is much higher, estimated from 3.8 to 10.3 injuries per 1,000 skiing days. The subjective risk is lower, however, because fatalities are fewer. This suggests that the uncertainty of the outcome and the nature of the consequences for failure must be appropriately weighed in determining their contribution to the assessment of risk.

Because risk itself may be viewed in several different ways, we must be cautious about lumping a group of activities together under the label of risk recreation. A related caution involves the use of misleading terms such as high adventure, thrill, stress, and challenge. Programs labeled with these terms are often believed to imply a high degree of personal risk when this may not be the case at all, particularly if proper instruction and supervision is provided.

In many types of recreation activities the risk involved is directly related to the skill level and experience of the participant. Obviously, less skill increases the hazards associated with many forms of outdoor recreation.

When activities such as rafting, kayaking, and mountaineering take place under the sponsorship of a recreation agency, educational institution, or club, instructors and leaders are expected to establish programs at levels commensurate with the participant's competency and experience. Such learning progression is certainly to be expected in any responsible skill-learning course. Initial exposure to

personal risk is thus minimized, although the stress level may often be high. Potential risks continue to be minimized as participants move up to more challenging levels of involvement as they develop advanced skills.

The ultimate degree of personal risk involved is, therefore, largely dependent on how far participants are allowed to transcend their levels of competency. In other words, the nature of the activity itself, the particular challenge it represents, and the point of entry to the activity can have a great influence on the statistical probability of accidents to participants. Factors which help to control the element of risk are adequate supervision, competent instruction, and the availability of good equipment.

### Reasons for Participation

In earlier cultures, humans took part in intense risk action in order to survive. Survival risk action is obsolete in our society. The human quest for excitement persists, however. Why is this so? A brief overview of some of the emerging theories may help us to understand this better.

It has been theorized that in societies where most danger has been controlled, and threatening types of excitement have diminished, a special class of leisure activities has evolved to serve the compensatory function of survival. People now seek and enjoy stress by testing their own limits and experiencing fear through self-imposed obstacles. This theory sets the stage for further exploration of the reasons for participation in risk recreation.

Most empirical research on leisure behavior has focused on the relationship between the use of leisure and such variables as age, sex, socioeconomic status, and occupation. Unfortunately, the limited information on demographic variables and their influence on risk recreation and participation does not permit firm conclusions to be drawn. Although a complete perspective has not yet emerged, a number of researchers conclude from their studies that factors other than those just mentioned are the major determinants of recreation choice.

### Portrait of the Risk-Taker

Personality testing reveals a relatively consistent portrait of recreation risk-takers. For instance, it has been found that risk recreation participants exhibit similar personality traits and also seek outcomes from adventure recreation which satisfy similar psychological needs. Although caution should be used when generalizing from a number of different research reports, risk-takers generally exhibit higher needs for achievement, dominance, exhibition, and aggression than people who don't take the risks. They are usually rated higher in self-assurance, confidence, and serenity and also tend to enjoy new experiences and dislike routine more than nonparticipants.

Other research has focused on various psychological measures of an individual's arousal threshold or need for stimulation. These investigations focus on particular theoretical perspectives such as arousal-seeking, sensation-seeking, change-seeking, curiosity, environmental preference, perceptual augmentation and reduction, and

stimulus-addition. While some attribute a link to biological or chemical explanations, as much as to psychological ones, the fact is that all of these concepts seem to have a great deal of theoretical and empirical commonality that can best be denoted as a need for stimulation or arousal that varies among individuals.

In other words, some individuals have a greater need to seek out higher levels of stimulation than others. The indication is that individuals having a high need for stimulation seek out recreational environments characterized by complexity, novelty, uncertainty, and other arousal potentials.

The phenomenon of stress-seeking is so complex that it demands a multifaceted approach in order for it to be understood. The reasons people participate in certain forms of recreation are likely rooted in a combination of psychological, social, and physical structures as well as the influence of society and culture. Still, there are other motives to engage in risk recreation that may be more easily understood than the abstract ones described.

For instance, some individuals pursue risk activities to test themselves, others for love of challenge, camaraderie, exploration, enjoyment of scenery, or communication with nature. The thrill of movement with the natural forces of air, water, or snow may be the drawing card for some, while others may simply be seeking a change of focus which allows them to forget about worldly problems.

### Values of Risk Recreation

When weighing the potential of personal injury which can result from participation in high-adventure leisure activities, it is important to credit yet other reasons for participation. It is necessary to look at values which can be derived from the risks involved. These values are often expressed in terms of goals or desired outcomes.

Enough has been learned about the subject to know that risk recreation programs often develop or improve physical fitness, coordination, sensory perception, environmental awareness,

*High adventure activities can positively affect a participant's self-development and social interaction.*

Pete Mills





*In many thrill sports the risk involved is related directly to the participant's skill and experience.*

Mark Scharfenaker

and ability to deal with stress. High-adventure programs can exert a positive influence on other elements of a participant's self-development, including self-concept, personality, social interaction, and achievement motivation. In fact, some of these changes have been most outstanding in special populations such as delinquents, academic underachievers, and mental patients. Therefore, unlimited possibilities exist for utilizing aspects of adventure and risk in programs sponsored by schools, institutions for delinquents, and agencies dealing with mental rehabilitation. If we recognize that recreation can provide a means for positive social growth, the inclusion of adventure and risk activities as a regular part of public recreation services seems justified.

The previous discussion leads to the assumption that various physiological, psychological, and social needs can be satisfied through particular forms of recreation. This assumption is based on the premise that risk recreation activities are expressions of human

needs. If the public sector does not provide properly planned, socially acceptable outlets for these needs, individuals will probably find less desirable means of satisfying them.

#### **Risk and the Administrator**

Provisions of outlets for risk and excitement will continue to be a challenge for park and recreation administrators. Regrettably, one frequent management response to this demand is the adoption of regulations which diminish or prohibit these opportunities altogether. Although this approach may significantly reduce injury rates, it does nothing to appease the desire people have to engage in exciting forms of recreation. A more appropriate response would be for managers to recognize the complexity of the experiences being sought and to strive to provide appropriate places and programs for those who seek recreation with challenge and adventure.

Certainly, if adventure programs are permitted, they can and must be carefully regulated to assure that they are adapted to appropriate levels of skill so that penalties for failure are not unrea-

sonably high. If this is done, challenges can be presented in a wide range of outdoor pursuits, ranging from backpacking to mountain climbing and from sailing to whitewater kayaking. The benefits derived in the form of positive values would usually outweigh the risks involved.

*Joel F. Meier is presently a professor of Recreation Management in the School of Forestry at the University of Montana. Dr. Meier has also served as an Outward Bound instructor for Peace Corps volunteers in Puerto Rico and has taught at the University of Nebraska. His avid professional and personal interest in the outdoors is demonstrated by the fact that he has taught many courses in mountaineering, whitewater kayaking, and outdoor leadership. He has also written and spoken widely on the subject of outdoor recreation and has served as President of the American Association for Leisure and Recreation.*

# Towards a System for Evaluating Visitor Safety/Accident Control Programs in Parks and Recreation

by William W. Davis, Ph.D.

As a park superintendent once said: "Safety is just like motherhood. Nobody's going to talk against your mother, but what you *do* for her is another matter!"

To understand this rather typical attitude is to realize the status safety holds in the park management field. How and why has this situation developed? For many years the slogan "Safety First" has been used to illustrate what some felt was the priority this aspect of management's overall program must take. Unfortunately, the "Safety First" campaign has engendered the feeling that safety is different and separate from other management concerns. In turn, this has led to a strong belief that safety is something that we just have to live with—a necessary evil—and that it holds no real promise for the park and recreation profession.

As progressive safety professionals, it is our role to show management that a good accident control program will help achieve other operational objectives, whether they be maximizing profits or protecting the environment, while reducing operating expenses and improving the quality of the program. Safety *first* should no longer represent our goal but rather safety *with* purchasing, planning, design, policy, etc.

In employee accident control programs, one can address this issue by showing real financial savings that result from reduced lost-time injuries and workman's compensation benefits paid. Reports from the private sector tell of substantial rebates being made by commercial insurance carriers to companies for monies not spent for claims. In some cases, the size of these rebates was many times in excess of the entire safety program budget. The money that management will be able to save is of primary importance. Not to be overlooked are the secondary benefits of better employee morale and interest in the company—psychological needs Abraham Maslow considers high on the scale of human values.

Smart managers soon learn that Occupational Safety and Health Adminis-

tration (OSHA) standards are only the minimum requirement for their plan. The job of the safety manager in these situations becomes one of pulling with the management team to maximize profits, and not that of pushing the company begrudgingly into the 20th century.

## Statistical Standards

Both government and private sectors measure their employee safety program's effectiveness through the use of statistical standards. Accident frequency rates are computed using either the American National Standards Institute (ANSI) disabling injury frequency rate formula, or the OSHA incident rate formula. Motor vehicle rates are developed in much the same way. (See Table 1.)

Once rates have been developed, they can be compared among like industries or between plants. In such a manner, consensus standards are developed for judging the relative success of the safety and occupational health programs implemented by management. This straightforward approach allows for direct cost comparisons and assigns responsibility so that all levels of supervision can participate in and be held accountable for the safety performance of their shops and factories. Promotions and bonuses can be based on one's accident control record along with such factors as production control, cost control, and scrap-page, etc.



*Beauty and solitude can mask unknown hazards.*



"If there were a need for a guardrail, one would be there" best represents the attitude of many visitors toward safety precautions in our parks.

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### Visitor Safety and Accident Control

While park and recreation managers may institute the safety programs and policies developed in industry for their employees with success, both they and the safety managers become frustrated when trying to deal with the visitor safety/accident control program. This is one of the unique components of our field and should not be treated as unsystematically as it is currently. When considering visitor safety/accident control programs, the manager must understand that industrial solutions are of minimal application. Four important factors dictate the constraints for the visitor safety/accident control program.

#### 1. *The Employee-Employer Relationship of Industry is Missing.*

Industry works hard at eliminating risks in the work environment. Where

problems are encountered, engineers redesign machines and facilities to remove obstacles. Industries use job instruction training programs coupled with job safety analyses to prepare the employee to live safely in the workplace. Personal protective equipment is provided by the company and regulations are enforced regarding its use. The union, as a peer group, actively participates in enforcing safety precautions and incentives are given for accident-free performance.

In the park environment, there is no mandatory training that must be undertaken before one can participate. Any personal protective equipment which may be required (such as warm clothing, comfortable hiking shoes, personal flotation devices) must be provided at the participant's expense. Unknown hazards may exist which are

not removed from the environment while deviant behavior is not corrected unless observed by park personnel.

#### 2. *The Psychological Attitude of the Visitor is Different in the Park than in the Plant.*

Most of us resent regimentation and restrictions when enjoying our leisure time. Often we are lulled into a false sense of security because of our consumer protection-oriented society. "If there were a need for a guardrail, one would be there" best represents the attitude of many visitors toward safety precautions in our parks.

Some people come to the park specifically to experience risk. They enjoy the challenge of pitting themselves against nature. They seek out dangerous situations and resent administrative interference.

#### 3. *Enabling Legislation May Prohibit the Elimination of Areas of Considerable Public Danger.*

In fact, these areas can be the major attraction to the park itself! These concerns often preclude engineering remedies as used in the industrial workplace to design out safety problems. The legislative mandate, or management philosophy, must be carefully considered in the safety management program of the area.

#### 4. *Visitor Safety Objectives May Be Unrealistic.*

Currently, the National Park Service computes a fatality frequency ratio using a formula much like those of industry. Congress, the media, the public and senior managers look at these figures and judge safety's effectiveness. In my opinion, such statistics are of little value. They provide us only with a relative picture of changes from year to year, a comparative indicator.

While all of us would agree that a zero frequency rate is the most desirable condition and our eventual goal, it is unrealistic to set this as the criteria for evaluating the visitor safety/accident control program. The attitudes of some park visitors and the activities they choose in an environment not controlled for safety hazards do not allow us the luxury of using industrial statistical applications. Accidents will occur! There is no more fail-



*Few users expect to be exposing themselves and their families to much risk of injury when visiting the Mall in Washington, DC.*

ure for management in having 100 injuries than in having one when "zero based" reasoning is used to set safety objectives.

Like all management concerns, the visitor safety/accident control program must have achievable objectives developed systematically. Once set, the management team must be held accountable for its performance in reaching the stated levels of compliance. Managers should be willing to accept responsibility for the accident control program in such a format since now it is no different from any other program.

#### **Toward an Evaluative System**

With this understanding, let us discuss a conceptual framework for set-

ting realistic parameters for visitor safety. Any legitimate system should allow for three general factors:

1. Regional and park-specific differences based on the type of park management philosophy dictated by enabling legislation
2. The number of people using the park
3. The types of activities engaged in by the using public

Currently there are 22 management group categories used by the National Park Service. While many of the groups are similar in nature, it is my contention that different levels of acceptable accident rates to visitors attach to each management group type. Few users expect to be exposing themselves and their families to as much risk of injury when visiting the Mall in Washington, DC as they do when visiting large natural areas with their inherent environmental hazards. A visitor safety/accident control program

would allow for such differences.

Within individual parks there still may be areas where visitors expect little chance of injury. For example, within a natural park, the main visitor center and park office, its walkways, parking lots, and access roads should be designed to meet all safety and health requirements. Certain administrative and supervisory standards would be dictated as well. Very few accidents would be acceptable in such places.

Conceptually, the evaluative system would begin with a monitoring of accident rates for each of the management group types to determine patterns over time to establish norms. A psychological inventory of user attitudes toward safety would be developed and given to a statistically significant sample of users at locations within each group type as well as to the general public. Using the results of the normative and psychological studies as a reference



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TABLE 1  
ACCIDENT FREQUENCY RATES

**DISABLING INJURY FREQUENCY RATE (AMERICAN NATIONAL STANDARD Z16.1)**

The disabling injury frequency rate is based upon the total number of deaths, permanent total, permanent partial, and temporary disabilities which occur during the period covered by the rate. The rate relates these injuries to the employee-hours worked during the period and expresses the number of such injuries in terms of million-hour units by use of the following formula:

$$\frac{\text{Number of disabling injuries} \times 1,000,000}{\div \text{Employee Man-Hours of Exposure}}$$

**OSHA INCIDENT RATE**

$$\frac{\text{Number of disabling injuries and medical attn. injuries} \times 200,000}{\div \text{Employee Man-Hours of Exposure}}$$

**MOTOR VEHICLE ACCIDENT FREQUENCY RATE (AMERICAN NATIONAL STANDARD D15.1)**

The motor vehicle accident frequency rate is the number of motor vehicle accidents per 1,000,000 miles driven. This procedure is expressed by the following formula:

$$\frac{\text{Number of motor vehicle accidents} \times 1,000,000}{\div \text{Number of Miles Driven}}$$

point, safety specialists or park managers could begin to establish administrative standards.

**Safety Management Zoning**

To account for differences in exposure to risks within individual parks, the proposed administrative standards might take the form of safety management zoning. These zones could be shown through the use of color codes on public maps to illustrate to the users the types of dangers they face. Seven categories would be defined in the creation of a zone.

1. *Zone Color.* Red for high-risk, green for low-risk, with other colors used for varying levels.

2. *Activities/Environment.* The types of recreational activities which occur in the zone, the psychological attitudes of the users in the area, the amount of environmental modification allowed to

take place. The National Forest Camp and Picnic Site Levels of Environmental Modification and Recreation Experiences format is an excellent reference.

3. *Design Standards.* Factors dictating levels of compliance with safety standards such as the Life Safety Code, Federal Highway Traffic Safety Act requirements, National Electrical Code and National Fire Protection Association codes, etc.

4. *Administration/Supervision.* The extent and nature of support offered to the public by the park staff. "Levels of service" is a way to express this concept.

5. *Access for Special Populations.* Warnings as to conditions that would inhibit certain individuals from enjoying the full range of recreational opportunities in an area.

6. *Special Safety Concerns.* Operational factors which should be accounted for in emergency plans and services, in-

cluding formal communication systems between park staff and visitors.

7. *Accident Frequency Ratio.* The acceptable level of accidents that may occur in a zone before the park superintendent's visitor safety/accident control program rating is negatively affected, provided all the administrative standards are in force. This ratio would be a function of the general factors of management type, attendance, and activities engaged in.

Table 2 presents an outline of such a zoning scheme for the two extremes on the scale—the high-risk zone and the low-risk zone. Figure 1 represents a hypothetical graphic application of the safety zoning concept with a tripartite scale.

Administrative standards based on the concept of safety management zoning would greatly aid in the quantification of accident frequency rates for visitor safety/accident control programs. The advantages to such an approach are:

1. Not all parks are held to the same standard.

2. Managers may set safety objectives that can be realized.

3. The “all or nothing” approach of the zero frequency-based yardstick for evaluating visitor safety programs will be placed in proper perspective.

4. Public officials with limited resources to spend on safety can decide in which areas they wish to place emphasis (i.e., public education of dangers in the “red” zones, or building code revisions in the “green” zones to bring structures up to par).

5. Visitors can become better informed

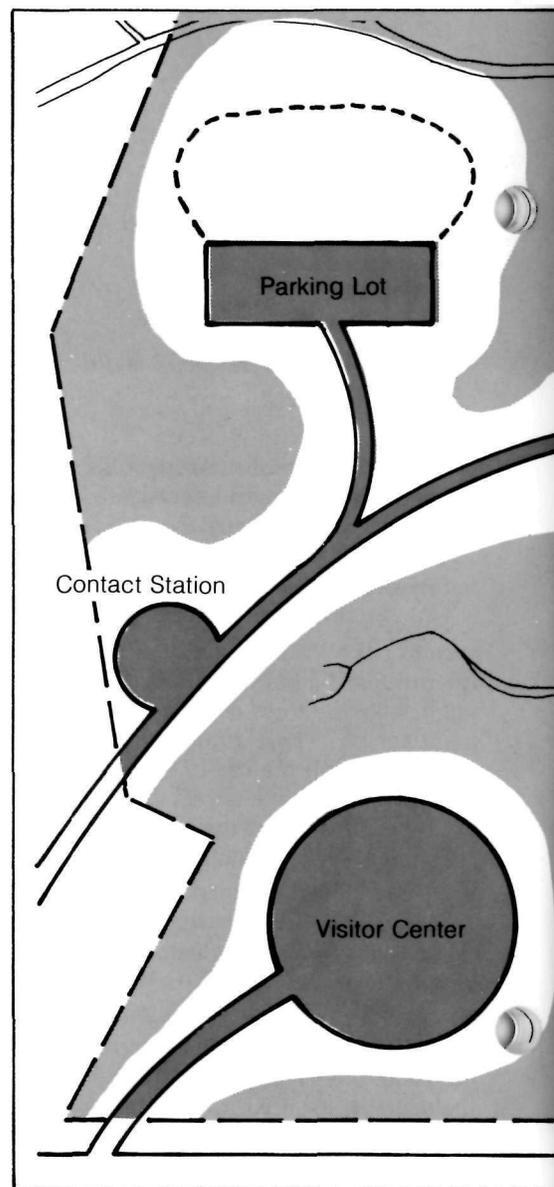
as to the nature of the risk they are exposing themselves to in certain recreational environments.

6. The solicitor will be better able to argue appreciation of or assumption of risk defenses in negligence suits since the administrative determination of risk zones will allow for public review and comment.

Conceivably, a visitor safety/accident control management plan could be developed for every park, along with other management plans. Even pre-authorization studies should address this issue.

Table 2

Zone Color	Green
Activities/ Environment	High degree of environmental modification, including the use of synthetic and foreign plant materials. Recreation opportunities satisfy an urbanite's need for relative solitude but also the opportunity to socialize with others. Regimentation of users obvious and a sense of security where ample provisions for personal comfort have been made is strong. Testing of outdoor skills limited to the camping activity only.
Design Standards	Facilities mostly designed for comfort and safety of visitors. Access usually by high-speed highway. Designs formalized and architecture may be contemporary. All safety codes for buildings, life safety, highways, roads, and public health apply.
Administration/ Supervision	Access limited by control points manned constantly. Registration mandatory and fees often charged. Formal interpretative programs incorporate safety messages. Park AM radio often provided. A visitor center is usually available for displays. Park personnel patrol area on regular basis. Safety messages included in literature but not necessarily provided to every visitor encountered by park personnel. Immediate emergency medical services available.
Access for Special Populations	Complete accessibility for individuals with all types of disabilities. Very few risks in every component of visit for all special populations, including senior citizens.
Special Safety Concerns	Visitors lack awareness of dangers outside of control zone. Repeated need for fire fighting, law enforcement, and emergency medical services. Planning and design critical to success of area. Formal communication methods with park staff need to be available for the user, such as emergency telephones and fire alarms.
Accident Frequency Ratio	Low. Safety hazards identified are removed or modified with barriers and warnings. This area is one in which people feel the dangers are no more significant than in their home environment.



PARK A—Figure 1

**Conclusion**

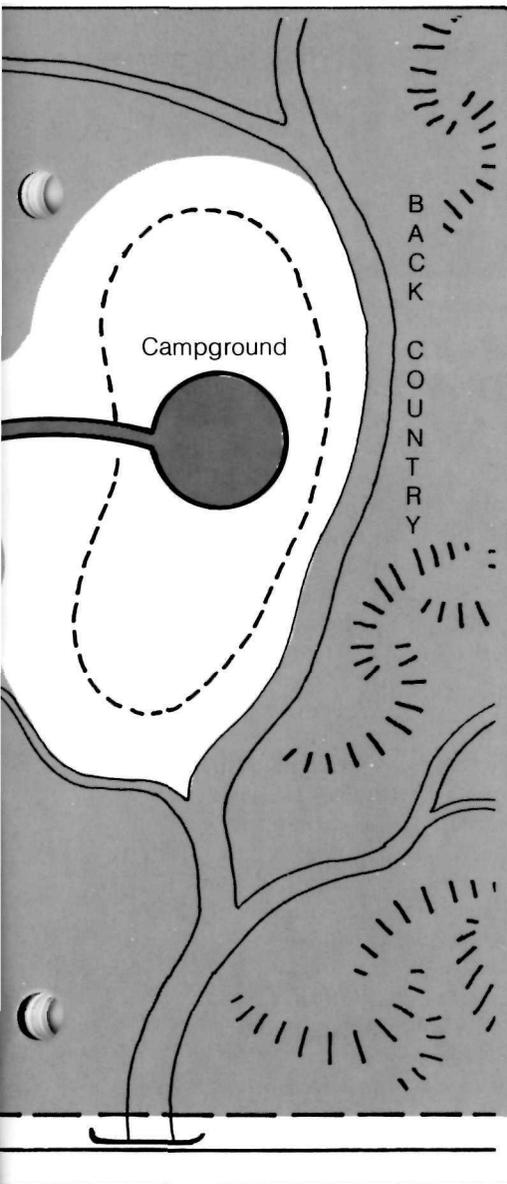
The job of the safety professional is to show management how safety and occupational health programs can help fulfill the mission of the agency. Strong employee safety/accident control programs produce reduced workers' compensation claims, lower insurance premiums, and higher productivity. All of these factors increase the profitability of the company. The parks and recreation manager must realize that industrial solutions have little application in the visitor safety/accident control program. The psychological attitude of users and the activities they

choose take place in an environment not controlled to eliminate all safety dangers.

Visitor safety management plans must be developed which set realistic objectives based on individual park differences, attendance, and activities. Safety management zoning is one way of identifying and quantifying these concerns. The mission of the parks and recreation movement is to protect the natural environment as well as to improve the quality of life through creative, meaningful leisure experiences. A strong visitor safety/accident control

program will do both by helping reduce the number of incidents which damage our land and our people. Management will enjoy the cost benefits that result as well as a systematic approach to setting evaluative performance criteria in this area of great national concern.

*William W. Davis, Ph.D., currently is a Specialist in the National Park Service Division of Safety Management. In the past he has worked for the North Carolina and Virginia state park systems as Superintendent and Park Ranger.*



**Zone Color**

**Red**



**Activities/ Environment**

Primitive forest environment is dominant. Recreation opportunities are ones requiring a maximum degree of outdoor skills. User beyond sight or sound of others and senses no regimentation. Psychological feelings of adventure, challenge, and solitude predominate. Physical feelings of reaching site important. Wildlife unrestricted.

**Design Standards**

Very few man-made structures intruding into the environment. When constructed, natural materials used exclusively. Motorized access not provided or permitted. No safety codes applicable to structures.

**Administration/ Supervision**

Unlimited access poses significant problems. Staging areas manned with park personnel during daylight hours. Some areas require permits, in all situations voluntary registration system in operation. Personal safety message and literature delivered to every visitor encountered by park staff on registering. Very rare contact with park personnel outside of staging area.

**Access for Special Populations**

No physical modifications provided. High risks in every component of visit for all special populations, particularly those in poor physical condition.

**Special Safety Concerns**

Visitors lack appreciation of dangers. Emergency rescues and searches hindered by prohibitions on motorized vehicles, dense forests, and are often very technical in scope. No formal communication system exists between park staff and user. Drinking water and sanitation problems. Wild fires allowed to burn out.

**Accident Frequency Ratio**

High. Recognition that this area specifically attracts "high risk seekers."

# Occupational Hazards and Industrial Hygiene

by Connie Villar

Employees report becoming sick and nauseated while on the job. Other workers develop sores on their hands. Still others complain of burning eyes and throat.

Hazardous occupational exposures occurring in general industry you say. Not anymore. These incidents and more like them occur throughout our parks with increasing frequency.

Parks of today are complex operations and have become like miniature industrial factories and plants. Because of our nature-oriented work environment, there is a tendency to think that exposures to agents such as carbon monoxide, benzene, and asbestos, to name a few, remain strictly confined to industrial sites. However, employees in park and recreation areas increasingly are subjected to the same occupational hazards and diseases as their counterparts in industry.

## A Need to Know

These incidents indicate the need to generate a knowledgeable awareness of the occupational hazards in our work environment and to take aggressive actions toward abating those hazards. This awareness should be fostered at all employment levels. Workers not only need to know how to do the job, they also need to know the potential hazards associated with it. Management should be involved because it is ultimately responsible for providing employees with as healthful a work environment as possible.

Industrial occupational hazards generally can be associated with particular productions or jobs. For example, a cotton mill can be expected to have cotton dust problems which upon chronic exposure can produce a lung condition known as byssinosis. Welders are subject to various injurious gases and metal fumes. Control of these hazards in industry is facilitated because of their limited scope and more manageable work environment.

This control problem is magnified in the parks because we have such diverse work environments (i.e., outdoors, indoors, temperature extremes,



*The personal sampling device being secured to employee will monitor samples and measure exposure to various industrial vapors.*

Bill Davis

and regional differences) and types of jobs (i.e., chemists, carpenters, landscapers, mechanics, conservators, printers, etc.). It is no wonder that occupational exposures in our parks can run the entire gamut of hazards.

There are four major categories of occupational hazards—chemical, physical, biological, and ergonomical stresses. The two highest target groups are chemical and physical stresses. These can be the most hazardous as well as the most commonly occurring exposures in the workplace.

## Chemical Stress

The greatest potential for occupational exposure comes from the use of chemicals. It is not only in a laboratory that employees are exposed to chemicals. Almost every job involves some contact with them. Mechanics use oils, degreasers, and gasoline; plumbers and carpenters work with adhesives, caulking compound, and acids; landscapers handle fertilizers and pesticides. Even office workers can be ex-

posed to chemical stress. The use of chemicals in our maintenance and special production shops is common practice.

A large percentage of these chemicals falls into the organic solvent class. These are used as cleaning agents, drying agents, paint thinners, chemical reagents in the laboratories, and in pesticides and wood preservatives.

## Solvents

A few of the more commonly used solvents are benzene, toluene, trichloroethylene, turpentine, and naphtha. These agents can pose a potentially high health hazard if they are used incorrectly or without the proper controls and protections.

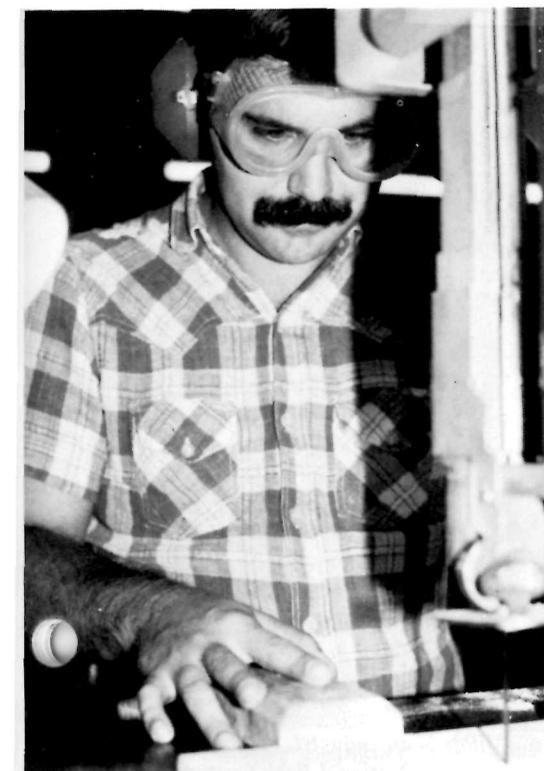
The best control method is to assure sufficient ventilation to dilute or carry away the solvent vapors before they are inhaled. When ventilation is inadequate to bring vapor levels below the federal standards, is not feasible, or while the controls are being instituted, the employee should be given



*Industrial nurse tests employee's pulmonary capacity.*

Connie Villar

Bill Davis



*Personal protective equipment varies with the work environment.*

adequate and proper personal protective equipment such as respirators, safety goggles, and protective clothing.

In the absence of these controls, inhalation of harmful vapors can affect the central nervous system and cause nausea, headaches, intoxication, and sometimes even death. Prolonged, repeated contact with a liquid solvent can remove the natural oils from the skin, producing a dry, fissured, skin inflammation.

Too often, workers use solvents with bare hands and with insufficient ventilation or protection. One should never degrease parts using bare hands, or remove paint from the hands with solvents. Yet, in many parks, these practices are widespread.

Although not the most serious effect, industrial dermatitis is the most prevalent injury resulting from exposure to solvents. These skin problems can be avoided by observing good, safe work habits, by the use of protective barrier creams and clothing.

Some of these solvents can be very toxic and produce far-reaching effects.

For example, chronic exposure to benzene has been proven to cause changes in the blood-forming organs. Long latency periods of 10 to 15 years from time of exposure to development of disease are possible.

This brings up another consideration in occupational hazards. Many of the ill effects will show up only after years of exposure or years after an exposure. An employee may not realize the potential harm of these agents when working with them because he or she is not immediately affected.

### **Asbestos**

A prime example of this is asbestos. For years, asbestos was used by the shipbuilding industry as lining for the ship's bulkheads and as heat insulation around pipes and boilers. Asbestos is also used in brake linings, asbestos tile, gaskets, and as heat and acoustical insulation. Workers who were exposed to airborne respirable asbestos 10 to 30 years ago now are exhibiting its ill effects. These can include chronic cough, difficulty in breathing, respiratory infections, cancer of the stomach and lungs, and a rare cancer form which involves the linings of the chest and abdominal cavities.

As long as the asbestos fibers remain bonded together or encased, they pose no threat. However, when an asbestos-containing product is cut, ground, sanded, or in a friable state, the fibers can become airborne and respirable.

Employees working with or exposed to asbestos now must be fully informed of the potential hazard and, where indicated, provided with the necessary protective equipment. In conjunction with the protective equipment, there are specific work practices that will help reduce dispersion of the fibers.

### **Physical Stress—Noise**

Physical stresses in the park include oscillatory vibration (noise, vibration), atmospheric stresses, (heat, cold, and air pressure), and radiation (ionizing and non-ionizing). Band saws, chain saws, tractors, snowmobiles, and compressors all can produce excessive noise.

If the employee is subjected to high levels of noise over a sufficient period of time, temporary or permanent hearing loss can occur. Hearing loss also can be caused by a sudden, loud explosion. Other factors which can affect the extent and degree of loss are the type of noise, the age of the individual, and prior injury.

The intensity or loudness of noise is measured in units of decibel (dB). For comparison, the loudness of normal conversation is about 60 dBA, lawn mowers register 91 dBA, chain saws range between 100–115 dBA, and a pneumatic tree chipper tips at 120 dBA. Table 1 shows the allowable decibel exposure limits in the workplace.

**Table 1**

Duration per day Hours	Sound level dBA Slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼	115

This means that when an individual is exposed to noise levels of 90 dBA, the duration of exposure cannot exceed 8 hours without that worker possibly incurring some detrimental effect over an extended period. If the noise levels are at 92 dBA, the worker cannot be exposed for more than 6 hours.

Engineering controls such as mufflers, shock absorbers, or enclosures and administrative controls like reducing duration of exposure are preferred. However, when they are inadequate to reduce the noise levels to acceptable limits, hearing attenuators such as ear plugs or muffs should be worn.



*Ear muffs protect laborer from 120 dBA intensity of tree chipper.*

NPS

### Radiation

Non-ionizing radiation includes ultraviolet and infrared rays. Ultraviolet or UV radiation is produced naturally by the sun and artificially by arcs operating at high temperatures. These invisible rays can cause a painful irritation to the unprotected eye known as "welder's flash." In addition to the welder, there also is danger to his co-workers and to passersby who might look at the arc accidentally. Therefore, it is very important that all such work be shielded.

Other effects of UV radiation include sunburns. Sunburns are of consequence to employees who spend the majority of their time outdoors or who are chronically exposed, for a dry, thickened, leathery skin can result. This actinic skin is a warning that other more serious conditions may develop. Chronic exposure to infrared radiation (IR) has been known to cause cataracts.

### Cave Monitoring Study

An example of ionizing radiation is the potential long-term exposure risk to employees from cave radiation. The National Park Service has been conducting a research and monitoring study in many of its caves for the past two years. As a result of this study, guidelines are being formulated which will help the parks manage this occupational stress.

Every work environment has its potential occupational problems. Much can be done and is being done to abate them. Controls like promoting safer work habits, assuring that employees are properly trained and informed to do their job, and providing personal protective equipment where needed can be accomplished with the minimum of effort and expense.

A major portion of the potential safety and health hazards can be eliminated through these methods. For example, at one park's maintenance/production shop, coffee mugs, personal medication, and food items were found stored next to containers of sulfuric acid and toxic solvents. It does not take much to stop practices like this. Ventilation controls require more technical and sophisticated measures. However, the best controls are worthless unless utilized.

Although direction and initial support come from management, it is the first line supervisor and the employee who make controls functional. It is at this level that the directives and guidelines must live and breathe. Spurred by management, each individual must take an active interest in the safety of his or her own job surroundings.

*Connie Villar is an Industrial Hygiene Specialist in the National Park Service Division of Safety Management.*

# Accident Analysis—A Statistical Survey of Park and Recreation Accidents

by Kay Doerr

The following statistics on employee and visitor safety within the National Park System may prove interesting and useful to park managers as they confront safety issues and challenges within their own park and recreation areas.

## Employee Safety

In 1978 the National Park Service employed 13,699 people. During that year 1,504 accidents and injuries requiring more than first aid were reported by Service employees. Of these injuries or illnesses, 854 required medical attention and 650 involved lost time from the job.

Approximate dollar figures established by the Department of Labor are \$102 for each case of medical attention and an average of \$1,691 for each case of lost time. According to these established figures, the National Park Service experienced a loss of \$1,186,258 from injuries and illnesses. Using the OSHA computation formula, these figures gave the Service a frequency rate

Ann Stentiford



This award-winning, copyrighted, no-swimming sign graphically conveys a danger message.



**Table 1** CALENDAR YEARS 1968–1978 INCLUSIVE

YEAR	NO. OF VISITS	NUMBER OF FATALITIES	NUMBER OF FATALITIES PER MILLION VISITS
1968	150,835,600	151	1.00
1969	163,061,100	182	1.11
1970	172,004,600	165	0.96
1971	200,543,300	167	0.83
1972	211,621,100	144	0.68
1973	215,532,200	179	0.83
1974	217,438,000	155	0.71
1975	237,772,568	145	0.61
1976	267,827,100	153	0.57
1977	260,500,000	190	0.72
1978	283,090,141	190	0.67

**Table 2** NUMBER OF FATALITIES BY CAUSES  
CALENDAR YEARS 1968 TO 1978

Cause	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Motor Vehicle	87	85	75	78	49	59	39	57	56	63	65
Drowning	37	54	50	49	61	73	73	56	60	77	81
Falls	16	17	18	28	20	28	22	22	27	36	35
Falling Objects	0	4	0	0	0	1	1	0	0	0	0
Lightning	1	1	3	0	1	0	2	2	1	1	0
Bears	0	0	0	0	1	0	0	0	2	0	0
Burns	2	0	2	2	0	1	1	0	0	0	0
Acc. Shooting	0	1	0	0	0	1	0	0	0	0	0
Exposure	3	2	3	3	3	6	6	1	3	2	0
Struck by Object	0	0	3	0	4	2	3	3	1	0	1
Asphyxiation	0	8	5	0	2	2	6	1	0	5	3
Airplane Crash	1	2	3	0	0	2	0	0	0	0	0
Missing	3	1	0	0	0	0	0	2	0	0	0
Rock Slide	1	0	1	0	0	0	1	0	0	0	0
Avalanche	0	6	0	1	0	0	0	1	3	1	2
Land Slide	0	0	2	0	0	1	0	0	0	0	1
Buffalo	0	0	0	1	0	0	0	0	0	0	0
Deer	0	0	0	0	0	0	0	0	0	1	0
Miscellaneous	0	1	0	5	3	3	1	0	0	4	2
<b>TOTAL</b>	<b>151</b>	<b>182</b>	<b>165</b>	<b>167</b>	<b>144</b>	<b>179</b>	<b>155</b>	<b>145</b>	<b>153</b>	<b>190</b>	<b>190</b>

of 9.9 incidents for each 200,000 man hours.

As a matter of interest, the OSHA computation formula is:

$$\frac{\text{Number of Accidents/Incidents} \times 200,000}{\text{Number of man hours worked}} = \text{Frequency Rate}$$

The 200,000 hours is derived as the average number of man hours for each 100 employees.

Earlier 1977 figures are not comparable to 1978 due to a change in reporting policy, excluding from National Park Service statistics those Youth Activities which are chargeable to the Department of Labor.

Employee injuries and illnesses prove to be the largest single factor in our total loss estimates of dollar costs to the government. Property damage, structural fires, motor vehicle accidents, and tort claims complete the overall picture of dollar losses.

	1977	1978
Motor Vehicle	\$182,816	\$235,873
Structural Fires	557,081	551,728
Property Damage	86,046	1,192,606
Tort Claims	383,654	1,215,605

These figures have a direct reflection on the employees of the National Park Service. Only through their efforts and the safety awareness of management can these costs be diminished.

#### Visitor Fatalities

In 1978, 190 visitors lost their lives in the National Park System. Table 1 lists statistics of the past ten years and shows the rate of fatalities compared to visitation.

During the past ten years, there have been numerous causes of fatal accidents within the National Park System. The top three causes are drownings, motor vehicle accidents, and falls. Table 2 provides further details.

Statistics regarding the age group of victims and the month of occurrence of fatal accidents also prove enlightening. Please note Table 3 and Table 4.

**TABLE 3** NUMBER OF FATALITIES BY AGE GROUPS  
CALENDAR YEARS 1968 TO 1978 INCLUSIVE

YEAR	0-12	13-25	26-40	41-50	51-60	Over 60	Unknown
1968	18	56	43	14	7	7	6
1969	13	81	42	12	12	20	2
1970	18	75	34	17	9	9	3
1971	13	67	34	21	19	10	3
1972	15	71	19	14	10	11	3
1973	18	81	42	12	11	12	3
1974	6	72	40	15	9	9	4
1975	14	69	30	12	9	10	1
1976	5	78	41	19	4	6	0
1977	19	85	45	8	5	12	16
1978	12	101	49	13	9	3	3

**TABLE 4** VISITOR ACCIDENT FATALITIES BY MONTHS  
CALENDAR YEARS 1968 TO 1978 INCLUSIVE

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
January	1	6	8	6	8	5	9	0	7	5	7
February	13	8	12	10	8	8	2	2	6	8	5
March	7	12	8	10	7	9	6	8	6	5	8
April	11	12	24	13	12	16	15	20	14	14	15
May	13	18	13	22	9	26	20	18	21	24	28
June	21	24	21	18	13	22	16	17	23	29	35
July	16	34	18	33	32	27	17	17	27	45	34
August	22	11	20	17	23	20	24	24	25	21	20
September	14	12	17	9	7	21	23	9	11	10	12
October	14	12	6	9	11	16	8	9	4	21	17
November	9	16	14	9	8	6	9	15	5	5	3
December	10	15	4	11	5	3	6	6	4	3	6
TOTAL	151	182	165	167	143	179	155	145	153	190	190

By disseminating these statistics through its various safety programs, the National Park Service hopes to alert park visitors to the dangers they may encounter and promote greater safety awareness. The difficulties lie in educating a primarily urban society to the dangers of the backcountry and to the fact that—as the statistics verify—bears are not public enemy number one in the National Park System!!!

*Kay Doerr is a Safety Specialist in the National Park Service Washington Office's Division of Safety Management.*

# Risk Management in The Maryland-National Capital Park and Planning Commission:

by Richard C. Stevenson

"Risk management" is a term we have heard for some time in the private, corporate environment. Only in recent years have public, governmental bodies been using the term. The need for risk management principles in government has risen in much the same way as it has for the private sector. Rising insurance premium costs, greater responsibility to the public, fewer tax dollars to conduct the business, and the overall need to preserve and protect the assets of the governmental entity from loss, have made this course necessary.

The Risk Management Program of The Maryland-National Capital Park and Planning Commission (M-NCPPC) places emphasis in three specific areas. These areas are a responsibility to the public, to its employees, and for the protection of the physical assets of the Commission.

Among the numerous facilities and activities that this agency is responsible for are: daily recreational activities in community centers, summer playgrounds, golf courses, swimming pools, ice rinks, camping, nature centers, programs and projects for special populations, art and cultural activities, and sports. To provide these services to the public, a number of divisions are responsible for the acquisition of land, and the planning, design, and construction of appropriate facilities.

A critical item within both the construction of facilities and their operations and programming is risk management. The Commission has endeavored to provide services to the community and reduce insurance and risk concerns through several unique techniques.

## Cooperative Agreements

The construction of several facilities has actually been done by community organizations at their own cost, with the community assuming all insurance responsibilities. As a part of the negotiated arrangement, these sponsoring organizations receive semi-exclusive use of the facility several days a week for their activities; other times, the general public utilizes the facility, with the community organization also providing all maintenance services.

Additionally, arrangements recently have been concluded whereby community organizations are "adopting a park." The organizations virtually assume all daily maintenance responsibilities of neighborhood parks, with the Park and Planning Commission retaining all liability responsibilities, as well as assuming appropriate insurance responsibilities for the volunteers while they are working within the park.

## Self-Insurance Program

In late 1977, The Maryland-National Capital Park and Planning Commission, feeling the ever-increasing burden of rising premiums for its various insurance programs, obtained permission from the Maryland State Legislature to become self-insured, except for employee group medical benefits. On July 1, 1978, The Maryland-National Capital Park and Planning Commission, in cooperation with Montgomery County, the Montgomery County Board of Education, and Montgomery College, entered into what is now known as the Montgomery County Self-Insurance Program.

This program provides a banking-type pool for each participating entity. In addition, excess insurance coverage is purchased by the pool for certain areas having a catastrophic exposure, such as comprehensive general liability and auto liability.



The increase in visitors to park areas contributes to growth of motor vehicle accidents.

M-NCPPC

Certain other administrative services are purchased by the Self-Insurance Program for the benefit of all members participating in the program. Some of these services are claims adjusting service, legal assistance, and consulting service involving risk management matters on a case-by-case basis.

The program as established by The Maryland-National Capital Park and Planning Commission is not completely self-insured. Certain specialty areas are still insured, and excess property coverage is purchased, including DIC, for catastrophic protection of The M-NCPPC's physical properties.

### Loss Control and Safety Program

Going from a program that is insured to one of self-insurance has required many changes on the part of The Maryland-National Capital Park and Planning Commission. Services normally provided by an insurance company are now provided by the Commission. Due to the many different types of programs and facilities the Commission operates, the success of the M-NCPPC's Self-Insurance Program depends upon the extensive "loss control and safety program" established by the Commission.

In addition to the risk manager, the Commission has a full-time safety specialist who is constantly involved in training programs for Commission employees and volunteers. Some of the training programs provided are: defensive driving, CPR, first aid, and use of safety equipment. In addition, a special safety training program has been established this year for lower supervisory personnel and foremen.

Since the Commission operates in two Maryland counties, two separate safety committees have been set up, one for each county. Representatives on these committees come from each respective department operating within each county. The safety committees meet on a monthly basis to establish goals and objectives for the Commission's loss control and safety program. The risk manager and the



*Defensive driving is one of several training programs provided by the M-NCPPC.*

M-NCPPC



*M-NCPPC assumes appropriate insurance responsibilities for volunteers, such as these, while they are working in the park.*



*Under cooperative agreements, communities construct facilities and assume insurance risks in return for use privileges.*

M-NCPPC

safety specialist are members of both these committees and provide expertise and instruction to the committees.

#### **Incident Analysis Program**

Recently the Commission has established a computer-assisted loss and incident analysis program. Through the use of this program, risk management will be able to pinpoint problem areas, as well as project trends and future losses. The projections as to future losses will be extremely helpful in determining future levels of self-insurance funding by the Commission.

Since the M-NCPPC's Self-Insurance Program is only in its second year, any predictions as to its success might be somewhat premature. However, there is no doubt substantial tax dollars have been saved for other programs that will benefit the public which the Commission serves.

Measures have been taken to secure the program against catastrophic loss, and the Commission's administrators are confident as to the success of the program. Reasons for this confidence focus primarily on the loss control program and the support it has received from management and all other Commission employees.

In summary, with the decreasing tax dollars available, along with escalating inflation, more and more governmental entities will be moving toward self-insurance. This step cannot be taken lightly, for only by aggressive loss control management can ultimate success be realized. The Maryland-National Capital Park and Planning Commission has made loss control the cornerstone of its entire risk management program.

*Richard C. Stevenson is Associate Director for Facility Operations in the Department of Parks and Recreation within The Maryland-National Capital Park and Planning Commission.*



M-NCPPC

## Safety as a Collateral Duty—Seashore State Park

by Thomas L. Gregory

Like many other parks, Seashore State Park, located in Virginia Beach, handles safety responsibilities as a collateral duty. Such factors as safety, time, and money influence management decisions regarding public relations, maintenance, training, law enforcement . . . the list goes on. Concern for both visitor and employee safety impacts directly upon the park's overall operation; within everyone's day-to-day tasks and duties, safety is a collateral responsibility.

### Visitor Safety

Guests spending their leisure time using a park and its facilities expect and require a safe environment. The actions taken to provide this safe environment depend to a large extent upon the specific recreational opportunities available in the park. At Seashore State Park, we offer camping, cabins, picnicking, hiking, bicycling, nature interpretation, boating, fishing, crabbing, and other beach- and water-related activities. To provide a reasonably safe environment for utilizing these opportunities, we weave safety awareness into all our contacts with visitors. For example, the park's maintenance, visitor communications, and law enforcement posture all contain important visitor safety elements.

### Maintenance

Park maintenance has an important collateral safety function. Providing clean, well-lighted restroom facilities and keeping picnic tables and grills in good repair are ways of maintaining a safe environment for guests as well as providing good public relations for the park. Maintenance of directional, speed limit, and bicycle crossing signs, and picking up glass, cans, and other litter from trails and grounds, minimize the chances of an accident. Most general maintenance performed in the park has a positive effect in providing a safe environment for park guests.

### Communication

Communication is another tool by which we try to provide park visitors with a safe environment. In conversations at contact stations, restrooms, and from park vehicles, park employees assist visitors with information ranging from the location of drinking water to what parts of a crab not to eat.

Nature interpretation, through guided hikes, evening programs, and exhibits, is a meaningful part of the visitor's outdoor experience. At the same time, interpretive programs and activities can provide guests with such information as what articles of clothing and what type of shoes are best suited to hiking, what plants and creatures to avoid while exploring, how to ride a bicycle safely, even what to do for jellyfish stings. Our nature interpretation, in other words, offers park guests information on what is available for them to enjoy and also advises them on how to spend their leisure time more safely.

Brochures also can communicate safety information to visitors. Seashore State Park brochures are prepared and supplied by the central office of the Division of Parks in Richmond, Virginia. The information contained in these brochures included rules for safe biking, areas designated as possibly unsafe for swimming because of strong currents, and other pertinent safety rules and regulations. Maps of the park's approximately 30 miles (48.3 km) of hiking trails also are made available for visitor orientation and safety awareness.

### Law Enforcement

The law enforcement policies set by the Division of Parks clearly express the Division's concern for the safety of visitors. This concern may be best stated in the "Virginia State Parks" brochure: "Regulations are not intended as restraints to enjoyment by park visitors, but as aids for orderly operations and guides for the protection of people, wildlife, environment, and public property." Our law enforcement activities probably are the most obvious duties we perform to provide a safe environment for park visitors.

Thus, safety considerations permeate all our contacts with visitors. They in-

fluence the services and facilities we provide for the visitor and impact on many of our decisions concerning daily park operation—often without our being conscious of them.

### Employee Safety

There are many guidelines provided through OSHA and others concerning employee safety. But we, the employees, have the responsibility of seeing that these guidelines are implemented. In effect, we must create a safe work environment for ourselves. The primary methods we use at Seashore State Park to create this safe work environment are training and safety awareness promotion.

### Job Training

Training methods and needs vary according to the employees with whom you are dealing and the specific duties they are expected to perform. Seashore State Park employees can be divided into two categories: permanent and seasonal. Job responsibilities determine the training both groups receive.

- *Permanent employees* work on a year-round basis and must meet certain training requirements set by the Division. Most permanent employees must be trained in defensive driving, first aid, CPR and law enforcement. In addition, they are given narrated slide presentations on specific job-related subjects such as lawnmower maintenance and operation, the uses of muriatic acid in cleaning, etc. In all these presentations, there is a strong emphasis on safety. On-the-job training with experienced park employees completes the basics of training we give permanent employees.

- *Seasonal employees* who work during periods of peak visitation, generally are college and high school students on summer vacation. They present problems in training due to their transiency. Our permanent employees have the responsibility of training these young people to carry out their duties in an efficient and safe manner. Public relations, vehicle operation, the care and use of tools, fire fighting, and the cleaning of park facilities are some of the training topics presented to seasonal employees.



Seasonal employee presents training session on replacing a lawnmower blade.

John Roderick, Jr.

### Defensive Driving

Employees whose duties include the operation of park vehicles are given detailed safety instructions. For example, they are taught to check behind their vehicle before backing and to tap the horn to alert others of their intention to back. Drivers are held responsible for their vehicle and are instructed to check oil, water, and safety equipment such as first aid kits, flares, and fire extinguishers. Drivers are also responsible for fellow employee passengers. If passengers are riding in the rear of a truck, they must be seated on the bed, not on the side or on an open tailgate.

### Employee-Conducted Tool Use Sessions

The care and use of park equipment such as lawnmowers, chain saws, tractors, electric meters, axes, welders, even hammers must be thoroughly explained to seasonal employees. One method of instruction we have found to be beneficial is for each seasonal employee to pick a tool and present a

training session on that tool. The employee "instructor" is provided with any operating manuals and written material available on his or her topic and is assisted by permanent employees, when necessary, in preparing the session.

These sessions are held once a week. They last about half an hour and are attended by all available employees. Every session stresses safety to a certain extent—what safety equipment to use, the purpose and limitations of the tool, and the proper care and maintenance of the tool, etc.

This type of training has proven beneficial to the park in many ways. Through the sessions, employees have learned to use tools more efficiently and safely. The condition of the equipment, too, has been noticeably improved.

### Safety Awareness

Promoting safety awareness is a duty that never ends. Park employees must be made aware that accidents don't always happen to *other people*. They can

be reminded of this through posters, safety meetings, and through conversations. But, the best method of instilling safety awareness among employees is to set a good example.

Though our park management and maintenance duties are varied and diverse, most of them touch upon safety in some way. Safety plays an important part in every facet of park operation. Through indirect means, safety considerations improve our public relations, allow for more efficient use of manpower, and reduce costs caused by damage to equipment. Safety is, therefore, a crucial collateral duty for all park managers.

*Thomas L. Gregory is Assistant Superintendent at Seashore State Park in Virginia Beach, Virginia.*

# Road and Highway Safety—Tort Liability

by David C. Oliver

The management of paved thoroughfares in every setting and locale has become an important topic in recent years. This development is not only the natural result of increased traffic, more sophisticated technology, and citizen-group interest, but also a reflection of the stimulus of legal process as it impacts upon those administrators who have the responsibility for roadway maintenance, whether the setting is a modern Interstate arterial, an urban park, a rural forest, or a scenic or recreational area.

The phenomenon of the lawsuit, whether for revenge, comfort, or remedy, has been discussed increasingly in the national media. Commentators have referred to litigation as "the nation's secular religion" and it has been said that "tort law today has become the theater" with "applause . . . measured by the amount of money the juries award."

The increase in legal actions has paralleled the reduction of the protection formerly afforded to our civil entities by statute and common law. This system of protection was our legacy from English Parliamentary Government, which had as its central feature a King as sovereign. The belief that the "King can do no wrong" evolved into the doctrine of sovereign immunity which was deeply imbedded into American jurisprudence at the turn of the century. In essence, sovereign immunity meant that the government—in its abstract sense—could not be held liable when acting in its capacity as "governor."

But the leveling influence of American democracy, the fast pace of development, the rise of the philosophy of the welfare state with all its attendant social protection features, and the development of a uniquely American jurisprudence have all chipped away at sovereign immunity until the erosion process has left the "governor" covered only by a shroud of protection, and that shroud, it appears, may be transparent.

To those people who have been involved in planning and administering the park system in this country, just as to those involved with the road sys-

tem, the protection has been invisible, in the sense that it was there, made no demands, and could be ignored. A logical question which could arise in the minds of such people is "So what? I'm involved in aesthetics, personnel budgets, and concession activities. What do I have to do with signing, marking, and maintaining the paved arteries traducing my area?" What with worrying about environmentalists, politicians, and labor unions, the last thing most of us feel we need is a history lesson in the development of law. If we wind up in court, the lawyers take over. What impact is there on administration?

In the past, park administration, like highway building, has been a solitary pastime measured by in-house rules and self-imposed standards of excellence. But the courts are pushing the managerial process into the glare of the judicial system with its trials by public media, decisions by technically inexperienced juries, and sentencing by political cutoffs of appropriations. No longer is the manager's judgment at the time a sure protection; no longer is the traditional argument of performance of a governmental function a sure protection; no longer is the aesthetic dimension the most important part of park operations—the impact of judicial process and tort liability should be obvious.

Administration and management of your total park system now must incorporate the paved surface as a vital component. Preparing for legal actions arising out of defects in the design or maintenance of your roadways, just as preparing for environmental challenges, will take more administrative ability and time. The most important technique in countering opposition in legal cases is the formation of good habits. Good habits, put rather simplistically, involve inspection and documentation of maintenance activities and increased public relations and education.

It is absolutely imperative that you are aware of what is required as well as what is not required in administering a roadway under your jurisdiction. There are certain general duties which are common to all legal actions. These general duties provide a good rule-of-thumb for establishing administrative practices.

## General Duties

The basic law of design and maintenance is that a highway traveler lawfully using the highway is entitled to have that highway maintained in a reasonably safe condition. This has been qualified somewhat in that you are not required to function in the role of guarantor as regards safety. The courts do not require that there be a perfect condition of either repair or inspection. Nor are you required to go to the limits of human ingenuity to accomplish safety. In other words, you are required to exercise reasonable diligence to put and keep highways in reasonably safe condition for the uses to which they are subjected by an ordinarily prudent driving public.

The complete meaning of these simple precepts can be determined only by a case study approach, as different factual patterns will result in different interpretations. There is no legal foot-rule by which to measure conditions generally and determine with exact precision whether a condition constitutes a defect. While the discharge of a duty in accordance with generally accepted standards and practices may meet the test of reasonable care, decisions should be supported by a fully articulated and documented administrative record.

Whether a case involves signing, pavement markings, or more esoteric considerations, there are certain basic elements of reasonability which are common to each action. The law requires an anticipation of defects. While the frequency of inspection depends upon the condition, location, and circumstances surrounding the alleged cause of injury, it is difficult to begin remedial action when you are unsure of a defect's existence.

Precautionary action and quick responsiveness to system breakdowns require careful monitoring and surveillance, under all conditions, in order to discover latent as well as patent defects, design inadequacies, and normal deterioration.

## Engineering Standards

The courts also will examine closely generally accepted engineering standards and practices, such as the Manual on Uniform Traffic Control Devices



*Park roads are often narrow, winding and carry vehicles for which they were not originally designed.*

NPS

(MUTCD), maintenance manuals, standard operating procedures (S.O.P.), and technical publications. But you should be cautioned that such standards and practices are usually only minimum specifications.

An action not in conformity with such general standards will almost certainly result in a finding of duty breached, but compliance with a minimum does not conversely mean that you need not fear an adverse ruling. Where it can be shown that something more than the minimum is necessary to provide reasonable safety, then proper management techniques require that something more be done.

A reasonable plan of improvement is viewed by the courts as a legitimate function involving judgment. And, in the absence of patent defects the courts do uphold the principle that a road authority is not an insurer against accidents. There remains a great deal of residual respect for the technicians' judgment, particularly where knowledge of abstract principles, both engineering and legislative, is involved. Further, the courts do recognize that, notwithstanding technical mastery, it is simply beyond human ingenuity to devise a fool-proof plan. Liability is more apt to result in those cases where the execution of a set task is mishandled. If the time, mode, or occasion of performance are set out and a function is mechanical, then there is little room for error.

The courts will look to project design, sign and barrier placement, the availability of safer methods, and the presence of safety devices in determining whether a condition was likely to result in collisions or loss of vehicle control, or whether location was such as to avoid unnecessary dangers.

Before liability will result the court must satisfy itself that (1) there was a potentially dangerous defect, (2) that this defect was the causal factor in the accident, (3) that the authority knew or should have known of the defect, and (4) that the injured party was less responsible than the authority. Only if all four of these concerns are answered in the positive will liability result. The legal system does protect and respond to the needs of management while at the same time satisfying the societal need of making each person whole who has been injured as a result of a breach of government's duty.

### **MUTCD Implications**

The Manual on Uniform Traffic Control Devices (MUTCD) is beginning to appear repeatedly in liability actions. Everyone questions its implications, both for defense and claimant. Are there degrees of applicability? Do the distinctions in the precatory or the mandatory intent of individual sections make a difference? What future role is envisioned for the Manual?

Cases in which the MUTCD is involved are just like any other negligence cases. There is the same standard of the reasonable person—reasonable action; the same duties to make the road reasonably safe for the motorist to use. The MUTCD becomes in effect another factor to be considered—it does have probative value.

This works in two ways: the government may introduce the MUTCD in order to establish what is "reasonable," or the claimant can introduce the MUTCD either to show that the government did not follow its own recommended standards, or to challenge the recommended standard as being less than reasonable.

Let me discuss two of the potential situations arising in MUTCD cases, and their possible outcomes. In one instance, let us assume that the Manual has a mandatory requirement that X sign be erected in Y location under Z conditions. The controlling jurisdiction has failed to place the sign at all, or has placed the sign but has deviated from the required format.

What result? In all probability the failure to place the sign will result in a liability judgment—this is because the jurisdiction has failed to meet its duty to use reasonable care in creating a safe highway environment. In the case of the deviation, liability will be dependent upon the factual situation. If evidence can be introduced supporting the deviation, liability may be avoided. In many of these cases, however, the deviation is the result of carelessness or negligence and liability will ensue.

In the other instance, let us assume that the Manual has a mandatory or recommended application as follows: on a two-lane rural highway no passing signs may be erected 500 yards (450m) before certain intersections. As this has traditionally been a low-traffic roadway and as a result of budgetary constraints, a decision has been made not to erect such signs.

A claimant can come into court and put forth evidence showing changed traffic conditions, weather patterns, or any number of factors and allege that the MUTCD standard is something less than needed to meet the "reasonability" test.



**WARNING**  
**DANGEROUS TO SCRAMBLE ON**  
**SURROUNDING BOULDERS AND CLIFFS.**  
**FATAL ACCIDENTS OCCUR HERE ANNUALLY**

*Warning signs must be placed where potential danger exists.*

NPS

### Warning Signs

The law requires that warning signs be placed where there is a possible dangerous condition. It is really a simple proposition. Where there are visual obstructions, sharp curves, steep grades, narrow bridges, etc., signs should be in place and they should be sufficient to warn of the danger present. Yet, liability cases before the courts involve signing defects more than any other defects. Even where there is no absolute duty to erect a sign, once one is erected, it must be maintained.

The courts are particularly disturbed where unusual situations appear and no sign is present. Animals on the road, for example, can cause serious accidents.

In one western state, a motorcyclist ran into a steer while driving along a rural road. One of the issues in the resulting case was the applicability of the MUTCD which specified procedures to install traffic control devices in live-stock areas. No detailed specifications were found to be required in such instances. The court held that the application to be made of signs warning of "range cattle" are sufficiently apparent.

In another case, a plaintiff suffered serious injuries when his car collided with a horse on a highway. The court record disclosed that prior to the accident, the state and the Bureau of Land Management (BLM) erected a range control fence running parallel to and along one side of the highway. The fence blocked a natural game crossing for wild horses and caused them to congregate on the road. There had been numerous reported vehicle-animal collisions, giving the state actual or at least constructive notice of a hazardous condition. Since there had been no remedial action taken, and no warning sign had been posted, the jury was found to have been justified in its finding of negligence.

But you should also be cautioned that the courts carefully examine the surrounding circumstances. Failure to take protective action where necessary, in addition to posting warning signs, may result in liability. In one case in-

volving the New York State Thruway Authority, the failure to do more than post warning signs at the extremes of a 4.3-mile (6.8 km) long smog stretch which was caused by 17 marsh and woodland fires that burned for several days, was held to be sufficient negligence to render the state liable for accidents occurring in the smog stretch. The warning signs were found to be inadequate for a high-speed, unlighted highway. Precautions should have included successive warning signs, speed limitations, flares or other lighting sufficient to reveal the extent and density of the smog, and patrols to observe and act upon changing conditions and even escort traffic through the dangerous areas.

A similar result occurred in California involving a mud-slide which was under repair when the plaintiff drove into the area. The court determined that the state, having undertaken to sign the area, was obligated to sign it properly. In this case, a non-reflective 24-inch (60 cm) sign with 4-inch (10 cm) letters placed in the southbound lane was not "very visible" to passing motorists. Specification required by the state manual called for a 30-inch by 30-inch (75 × 75 cm) reflecting sign with 5-inch (12.5 cm) letters. Sign placement was required to be at 400 feet (120m), where here the existing sign was only 320 feet (97.54m) from the slide.

There are many other typical liability situations regarding signing. You should be aware, for example, that when construction is underway, the decision not to give a proper warning is beyond discretion. There is, likewise, a proper duty to place and maintain traffic control signs, such as stop signs; their presence, absence, and maintenance relates to the statutory duty to maintain a road in a safe condition.

The question of adequacy of signing is critical in determining liability. Placement of a sign in an unanticipated

position can constitute a trap for the unwary motorist. An unauthorized or nonconforming sign which is misleading, also may result in liability.

There is a duty to institute preventive maintenance with respect to traffic control signs. Advisory speed signs often need to be installed along with other control signs. Warning reflectors, reflectorized signs, reflectorized pavement markings, etc., are required at curves, water spots, intersections, and in advance of unusual situations.

### Barriers

Where safety barriers are necessary to ensure a reasonably safe road, then there is a duty to erect them. There are numerous factors which the courts look at in determining reasonability, such as the character of the road in question, the width and construction of the road, the slope or descent of the banks where the road is elevated, the direction of the road, and whether or not a condition is obvious or hidden. Barriers should be strong enough to carry out their purpose. They should be able to withstand the ordinary weights and forces to which they may be subjected.

In a recent New York case involving the Long Island State Park and Recreation Commission and the Department of Transportation, a plaintiff claimed injuries resulted from the inadequate installation and maintenance of median guardrails on the Southern State Parkway. The accident took place at approximately 8 o'clock a.m. when the plaintiff was on his way to work in his 1973 Ford van. The road condition was wet and an intermittent light drizzle was falling. The plaintiff testified to observing icy patches along the road.

The road is a six-lane highway with three lanes in each direction. The plaintiff testified to traveling at a speed of 30 to 35 miles (48 to 56 km) per hour in the extreme left lane when the car in front of him slowed. He skidded, lost

control, proceeded onto a grass strip, and struck a guardrail. Upon impact, the wood cross-beam of the barrier fractured and separated from a post. It entered the vehicle and caused serious injuries.

In order to find liability it had to be shown that the state did not provide barriers of sufficient strength to hold an automobile traveling at a reasonable rate of speed at points of particular danger along its highways and bridges. The median barriers at issue here consisted of steel cables strung between two wood posts. The cables were covered by wood cross-beams. It was testified that the purpose of the barrier was to prevent vehicles from leaving the highway and hitting a concrete overpass abutment, as well as to serve as a barrier to traffic approaching from the opposite direction.

The plaintiff contended that the wood barrier was not properly designed and adequately tested prior to its installation and that the primary reason for its use was for aesthetic appearance; it served no functional purpose.

Witnesses, including the state's principal witness, established that tests done on the barriers appeared to be, at most, onsite general inspections with no controlled experiments of particular kinds of impacts. There were no accident records or tests prior to 1970 and the engineer in charge of the Commission's engineering department since 1970 stated that there had been no tests of wood guardrails from the time of his appointment.

Evidence was introduced indicating that the Research and Development Bureau of the Department of Transportation (NY) was concerned about the use of wooden railings. One memorandum stated that ". . . a wood rail cannot tolerate much deflection without failure and even though the cables may prevent a total break, *we would be fearful of wood sections penetrating the passenger compartment of an impacting car.*"

Other memoranda criticized the underlying desire to use the timber guide rail for aesthetic purposes, as it did not have the impact behavior of conventional steel barriers. On testimony, it was adduced that the Long Island State Park and Recreation Commission re-

quested the use of wood rails to maintain the "rustic appearance of the parkway." The court stressed this point and stated, that from the evidence, it appeared "that the Commission was more concerned with rustic aesthetic appearance rather than with the design, engineering, and safety of the system."

The court found that the state did not properly design and test the wood beam-cable guardrail system. Approval of the guardrail without adequate prior study constitutes lack of a reasonable basis. Subsequent events demonstrated the existence of a dangerous condition known by the state and this constituted negligence. Recovery totaled \$475,000.

#### Levels of Inspection and Trimming of Trees

In the environmental area, "To Cut or Not to Cut" is the question facing many officials when overhanging trees or branches are involved. The environmentalists resist cutting down trees, particularly those trees which have some historical or botanical interest. But it is often these trees which are in close proximity to thoroughfares and which, because of their age or exposure, offer potential dangers.



Because of their age or exposure, overhanging trees often are potential dangers to thoroughfares.

Scenic settings such as forest thoroughfares, parks, or parkways require a higher standard of care as regards inspection than they have been given in the past. Diseased limbs and trees must be identified and removed. Adverse weather conditions require increased vigilance.

A Louisiana case involved injuries arising out of a collision with a tree lying across a state highway. An accident occurred on a rainy night in generally unfavorable weather conditions, around 3:50 a.m. For several days previous there had been bad weather in the area and the highway department had sent a crew out to clean up trees and debris blown down by the wind and to seek out and remove any trees which might fall onto the highway. The tree in question was a large pine tree which was overhanging the road. It had been inspected two days prior to the accident but had not been removed.

Liability only ensues where a condition is (1) obviously dangerous to a reasonably careful motorist and (2) the department has notice of the defect and an opportunity to remedy it. The court said:

It is obvious that a highway with a large pine tree completely across it is not "reasonably safe" for the motoring public. As shown by the facts of this accident, the pine tree was a sufficiently dangerous defect so as to cause the accident and the Department had notice . . . of the potential danger. . . . The Department had reasonable time to remedy the situation by cutting down or otherwise restraining this tree.

The Department cited in its defense a 1978 case in which it had been held liable in damages to a landowner for cutting down a "landmark" pecan tree located on private property and in which the court had chastised the Department and cautioned it to be wary of destroying private property overhanging a public way without observing legal process, unless the tree con-

stitutes a public nuisance or poses imminent danger to users of the right-of-way.

The court here felt that the totality of circumstances, including the failure of the Department to contact the property owner to inform him of the danger posed by the tree and to request his permission to remove it, negated the Department's position. The court said:

In our opinion, the duty of the Department of Highways to maintain its highways in a reasonably safe condition for the safety of the traveling public is so great that where a situation of imminent danger is posed to the users of the highway because of a tree or other hazardous instrumentality situated on private property along the highway right-of-way, the Department cannot sit back and ignore the dangers posed because the danger-causing object is situated on private property. At worst, in this case, had the State cut the tree down without the landowner's permission, it could have subjected itself to a matter of a few hundred dollars in damages . . . . On the other side of the coin, to save a possible few hundred dollars in damages, the Department having actual knowledge of the danger posed by the tree, sitting back and doing nothing, exposing unsuspecting members of the traveling public to great bodily injury or death, seems to us to be an anomalous situation, which we cannot sanction. Recovery: \$9,617.70.

In a Washington, DC, federal court case, a portion of a triple-trunked tulip poplar tree fell on a car resulting in permanent disabling injuries to the plaintiff. The portion of the tree which fell weighed 10 tons (9t) and was 90 feet (27m) in height and 21 inches (52.5cm) in diameter. The trunk revealed evidence of rot.

There was substantial evidence introduced at the trial concerning the susceptibility of V-crotched trees to structural weakening and rot. The ac-

cident occurred on the Rock Creek Parkway, a federally owned and maintained road pursuant to congressional authorization to "preserve forests and natural scenery in and about Washington, DC." The land on which the tree stood is owned by the Government of India, which had agreed to "preserve the present natural parklike character" of the land.

The National Park Service maintains and services this portion of the park and was unaware that the land was not federally owned. The tract had been maintained for at least 10 years as a Class C park, which requires weekly observation for the detection of diseased trees.

The court said that the appropriate level of inspection and maintenance of a particular roadway depends not only on the expense and burden of various maintenance programs, but also on the characteristics of the surrounding land and the roadway itself, including the type and extent of dangers posed thereto. For example, a seldom traveled roadway in a national forest in a rural area would require fewer inspections and a different type of maintenance than would a heavily traveled thoroughfare in an urban area.

Further, said the court, ". . . As well as providing undeniable beauty and majesty, forests can be sources of danger and discomfort. Indeed this is undoubtedly a reason why forest preservations are not often found in densely populated areas. Reasonable care, given the danger posed by tight V-shaped formations, is to inspect at least periodically such trees growing adjacent to the roadway." It was established that these trees were not individually observed or examined to determine whether disease or weakening was occurring.

Of course, the court also pointed out that the distinction in the standard of care owed to trees in urban areas as opposed to rural areas has become less clear as a result of the increase in traffic through the rural countryside. In sum, the relative level of care required for assuring a reasonable degree of safety in various parklands may not be commensurate with the relative level of maintenance required to achieve aesthetic objectives.

Recovery in this case was \$975,000.

## Conclusion

The easiest approach to take when confronted by these issues is to adopt the Ostrich Syndrome. As all of you are aware, if you don't see an unpleasant sight, it isn't there. But I submit that in this age of "deep pocket" jurisprudence, of scientific management, of public awareness, that the Ostrich Syndrome can only result in ever-increasing liability actions.

The basic premise on which liability rests remains the same, whether signing, striping, construction activities, wet-weather conditions or basic maintenance defects are found. Thus, protection against liability actions relies upon a soundly developed management approach. Operational standards, where available (such as found in the MUTCD), should be carefully implemented and it should be remembered that where more care is called for, more care should be taken. Regularized inspection procedures are a key component of sound management. When defective or unusual situations are identified, warning signs should be immediately employed, followed by remedial action based on a priority system of improvements. Maintenance checks should be routinized.

The cases we have discussed above indicate that aesthetic considerations are only one of the things a court must examine and that safety never takes second place to aesthetics. This, of course, complicates your job immensely.

Keep in mind also that scenic, recreational, and wooded areas present the average motorist with a wide variety of unexpected impacts—and it is the unexpected that tort liability is all about. While you may not be able to eliminate accidents entirely, by following the above basic steps you should be able to reduce your liability exposure, which will allow you to vote more resources to your primate activity and make the Nation's scenic and recreation areas a pleasant and safe experience for the motorist.

*David C. Oliver is an Attorney Advisor in the Federal Highway Administration, U.S. Department of Transportation.*

# Providing Safe and Healthful Concession Facilities and Services

by L.E. "Buddy" Surles

Many concession facilities are utilized to feed, house, and otherwise service the millions of people who visit our parks each year. When these concession facilities are old or historic structures, safety considerations for both employees and the visiting public are compounded.

Fire, perhaps, is the most pressing concern. Within the National Park Service, for example, it is recognized that the engineering and construction of such facilities as the Old Faithful Inn in Yellowstone, El Tovar of Grand Canyon, and The Ahwahnee on Yosemite Valley just cannot be duplicated today. To destroy these historic structures would both violate the Service's protection mandate and shortchange Americans of a valuable part of their cultural heritage. Yet, the hazards that exist due to obsolete electrical and water systems, the lack of elevators, and dry wood could consume a building within a short time, should fire break out.

To minimize fire and other safety hazards for park visitors utilizing concession services, good safety programs need to be designed—programs that will alert management to the existence or development of unsafe conditions. Input to the program should be wide. All park employees can help spot potential hazards; safety personnel then can scrutinize them more closely. Often safety specialists can suggest remedial action that permits the use of

the facility while minimizing the hazards. The millions of visitors who roam park facilities also can play a major role in notifying the park agency and its concessioners to safety hazards, particularly to early indications of fire.

## Safety Evaluations

Comprehensive safety and occupational health evaluations of every concession facility should be conducted annually by agency safety personnel. If safety specialists are not available within a particular agency, the administrator should look to other agencies within the government entity or contract for those services from a private firm.

The standards for judging safety are predicated on provisions established by the Occupational Safety and Health Administration in 1970. Additionally, the park agency should develop a safety and occupational health inspection guideline that follows standards established by the National Fire Protection Association and the American National Standards Institute, yet also takes into account the uniqueness of the particular park or entity.

The comprehensive annual safety inspection should be augmented by three other safety inspections:

1. The concession operator should make a safety inspection prior to opening facilities to employees and visitors. This can serve as an excel-

lent training tool to familiarize concession managers and supervisory personnel with their work environment. Such an inspection is especially important in seasonal operations due to the high rate of new supervisory personnel utilized.

2. Designated concession employees should be required to make daily routine inspections in an effort to identify and eliminate safety and occupational health hazards.
3. Periodically, park personnel knowledgeable in safety should conduct inspections.

## Evaluation Standards

These safety inspections should be augmented still further by evaluation standards for the various facilities and services rendered to park visitors. For example, general standards, applicable to all facilities and activities, should include the inspection of and required corrective action within specific time frames for such items as: physical condition of both exterior and interior of buildings; illumination of the grounds; condition of stairways, railings, walkways, floors, and floor coverings; the presence of litter; and storage of flammable materials. These general standards should be designed not only to minimize fire and accidents, but to preserve structures and enhance the aesthetic value of the structures and the overall park area.



The NPS Nationwide Concessions Management Plan aims to preserve historic structures and facilities while bringing them up to standards.

Specific activities should have their own evaluation standards. For example, marinas and boat facilities should be inspected to ensure that dock surfaces are free of tripping hazards, that railings are provided and secure at hazardous locations, and that only approved electrical connections are utilized. Enforcement of good fire prevention standards at trailer villages would assure proper spacing between units, prevent storage of flammable materials under trailers, control improper installation and maintenance of liquid propane gas tanks, and limit the gallonage that can be stored safely.

Do all these efforts in protecting park visitors and concession employees pay off? Certainly. For example, in 1978 safety inspections revealed the existence of severe hazards at the Jordan Pond House in Acadia National Park (ME). To make the facility safe, a new fire detection and alarm system was installed and other precautions were taken. In spite of this, the half-century-old building was completely destroyed by fire early on June 21, 1979. But . . . had the fire detection system not been in operation, the 20 young women housed in the building might have been seriously injured or killed.

### Public Health and Concession Food Service

Public health, especially as it relates to food service, is another area of importance in concession operations. To maintain healthful food service operations, it is essential to work closely with the U.S. Public Health Service. Again, an evaluation program can be instrumental in spotting potential or developing problems and a section of the program should be devoted to food service sanitation.

A public health evaluation program should require facilities to be inspected by both the U.S. Public Health Service and an agency or state or local sanitarian. These inspections should be made at least quarterly for year-round operations and at least twice a year for seasonal operations, utilizing the 1976 Food and Drug Administration's Food Service Sanitation Ordinance.



*Quarterly inspection of year-round facilities is necessary to maintain healthful food service operations.*

NPS



*Clad in life-vests, passengers enjoy the rapids in a concession-operated boat.*

NPS

Health inspections should involve an examination of all facets of food service including food preparation, holding, storage, purchases from approved sources, equipment, and equipment installation. Water sources also should be closely checked. Further public health scrutiny should extend to swimming pool and stable operations and any areas surrounding livestock housing or sewage plants.

### Future Directions

While we recognize that many old concession facilities must be preserved due to their historic value, we still are obligated to provide for the safety and health of employees and visitors who utilize these facilities. To meet this obligation the National Park Service is launching a new program—the Nationwide Concessions Management Plan—which aims to preserve historic structures and facilities while bringing them up to standards where they are not.

The new program will require an in-

ventory of all structures to determine what deficiencies exist and how much it will cost to correct them. Priorities then will be established and corrections made according to priority order. The program will draw on the expertise of engineers of all types, sanitarians, safety specialists, historic preservationists, and economists. This ongoing program will enable the National Park Service to provide the public and its own employees with high safety standards while utilizing structures that were built generations ago.

*L.E. "Buddy" Surlles presently is Chief of the National Park Service Office of Concessions Management. Prior to this he has been Chief of Concessions Management at Yellowstone National Park (WY, MT, ID); Director of Parks for the State of Arkansas; and President of the Southeast Association of State Park Directors.*

## Bridge Safety

by Donald W. Miller

Bridge safety in park and recreation areas and elsewhere throughout the United States has received great emphasis and funding since the collapse of the Silver Bridge at Point Pleasant, West Virginia in 1967. The Federal-Aid Highway Act of 1968 required the Secretary of Transportation to establish a national bridge inspection standard. Under this act, each state was required to inspect and inventory all bridges located on federal-aid highways within its jurisdiction. This requirement has since been expanded and now all federal, state, and locally owned and maintained bridges are to be inspected and inventoried by law.

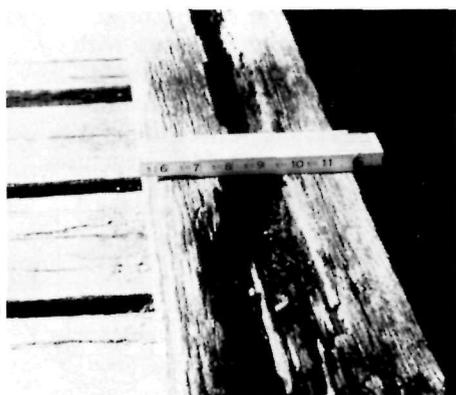
Bridge safety inspections are required to guarantee public safety and proper maintenance of a public investment. With thorough and frequent bridge inspections by qualified inspection personnel, the majority of bridge failures due to age and neglect can be prevented.

All bridge structures have common problem areas depending on their structural design, the materials used in their construction, and the environment to which they are subjected. Park and recreation area managers whose property contains bridges should be aware of these problem areas so they can spot potentially unsafe conditions in early stages.

### Timber Structures

Timber bridge problems, in most instances, can be prevented by the use of proper preservative treatments during fabrication and construction, and thorough housekeeping practices at regular intervals. For example, the ends of

Donald Miller



*This timber curb appeared to be in good condition. Closer inspection revealed complete internal deterioration.*

deck planks and curb blocks are highly susceptible to fungus attack. Timber bridges exposed to sanding and de-icing salts during the winter months and falling leaves in autumn are likely to have debris build-up along the curb line. This type of debris build-up tends to retain the moisture which promotes fungus growth. By clearing the deck of debris after the winter salting season and after the fall leaf season, most fungus attack on timber bridge deck members can be eliminated or retarded.

The most dangerous form of timber deterioration is internal decay or vermin attack. Both of these types of deterioration leave the outer surface of the timber relatively intact, while totally destroying the interior material. Therefore, a false sense of bridge safety exists. Many timber bridge failures can be attributed to undetected internal deterioration of wooden members.

For example, deck planking, curbs, and railing members usually develop cracks when exposed to sunlight and air. This is due to the reduction in moisture content in the outer surface of the wood. These cracks become natural water traps which collect the moisture needed for timber decay.

Crack sealer materials suitable for timber applications are commercially available. They can be applied easily by maintenance personnel without the use of special skills or tools. In essence, keeping timber bridge structures clean and as dry as possible are two crucial maintenance tips for extending service life.

### Steel Structures

Factors contributing to steel bridge deterioration include:

1. Neglect or lack of proper maintenance
2. Fatigue
3. Vehicular impact

Steel members generally require a high degree of maintenance in locations where water and debris will collect. Two common collection areas are the lower chord panel points in a truss structure and the bearings or beam ends in a multi-beam structure. In a steel truss where several members frame into one point, a natural debris collection pocket usually is found. The second common debris collection area

at the bearing seat of abutments and piers occurs when a deck expansion joint is located at the abutment or pier.

In time, deck expansion joints that use poured joint sealers or metal finger joints generally will allow sand and de-icing salts, along with other highway debris, to pass through the joint and collect on the beam ends and bearings. Debris such as leaves and sand are excellent retainers of moisture. Add de-icing salts to this moist material and you have created a perfect environment for the rapid corrosion of steel.

Steel corrosion left undetected at structural connections or splice points eventually can cause complete bridge failure. Corrosion of expansion bearing rollers or plates will cause excessive secondary stresses or forces to be induced into bridge members. The volume of rust found on steel members is seven times the amount of steel actually lost due to corrosion. Extremely high pressures due to rust build-up can develop between bearing and connection plates. This pressure will buckle steel plates or fail bolt and rivet heads. Routine housekeeping, good cleaning, and painting maintenance practices are effective in controlling most corrosion problems.

Common fatigue failures can be found at bolted, riveted, or welded connection points in steel bridges. Premature structural steel cracking can be attributed to material weaknesses induced by poor welding practices, loss of section due to severe corrosion of the steel, and high stress levels induced into steel members due to frequent loadings in excess of design loads.

Steel truss members that experience stress reversals (i.e., tension under one loading condition and compression under another loading condition) should be inspected closely for crack propagation by using current nondestructive testing methods if possible. Tests also should be conducted on members that have experienced vehicular impact. Metal tearing is a frequent mode of failure when steel member deformation occurs under a high rate of load application.

Many of the older steel structures are unsafe due to the lack of adequate protection of the structural members from vehicular impact. Older steel truss bridges are noted for poor railing systems. This generally is due to the fact that vehicle size and weights have changed considerably over the years.

Old trusses generally can carry safely only light vehicle loads. The use of proper warning signs is essential for bridge safety where weight limits or horizontal clearance restrictions are needed, and frequent, regular service of deficient or historic structures is important.

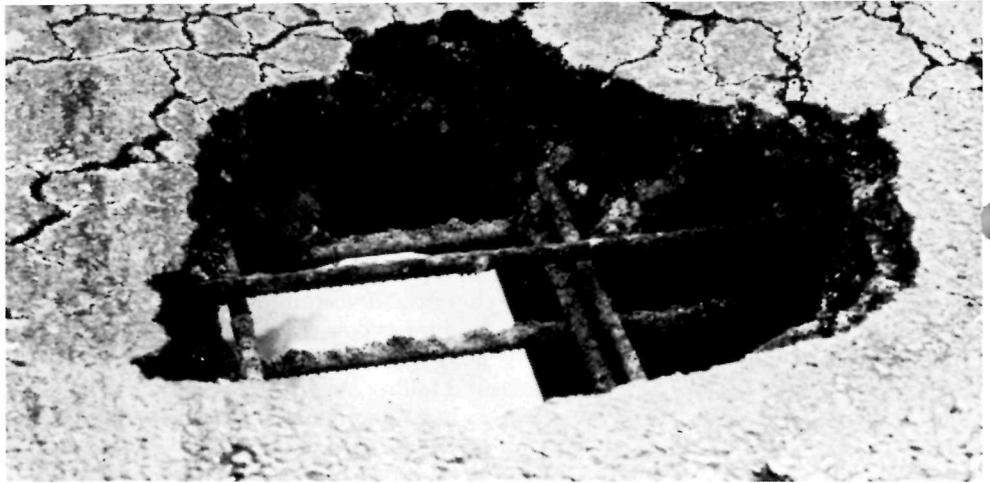
### Concrete Structures

Concrete structures are somewhat unique in that they usually show signs of distress long before any type of complete member failure occurs. Since concrete is a material that generally cannot withstand tensile forces, material distress usually first appears in the form of cracking.

For example, tensile stresses created by the formation of rust on the corroding reinforcing steel will appear as surface cracks in concrete with much the same random crack pattern as a spider's web. Tensile stresses due to material shrinkage or bending forces in a concrete member will appear as parallel cracks usually running transverse to the member. Shear cracks in concrete members will appear near the bearing area and be inclined at an angle of 45 degrees to vertical.

Common compression failures usually are found at closed expansion joints in the deck, curbs, or railings. Expansion joints can become closed or inoperative due to becoming filled with compacted roadway sand or gravel, bridge shortening due to concrete approach roadway movement, or substructure settlement and the resultant member rotation.

One problem area on most concrete bridges is deck and curb deterioration at the curb lines. This can be attributed to chloride build-up in the concrete as a result of winter de-icing salt applications and impact damage during snow removal operations.



*This hole developed in the deck surface approximately three months after the map cracking and efflorescence on the deck underside was observed.*

Donald Miller

Current maintenance repairs for deteriorated concrete consist of removing the unsound material and replacing it with an equivalent or higher strength patching material. In general, repairs to concrete structures are expensive because the early signs of concrete deterioration commonly are ignored. Only when large areas of deterioration are readily visible do people become concerned.

### General Safety Areas

- *Clogged deck drains* exemplify a common problem not associated with any specific type of bridge. Poor bridge deck drainage can be hazardous to motorists when it interferes with their vehicles or creates slick areas within the vehicle tire path. It is also detrimental to the bridge itself when road debris such as de-icing salts and other roadway chemicals are no longer removed from the deck by natural runoff. Bridge inspectors observe that concrete bridge decks that drain freely are not as susceptible to early deterioration as are bridges with clogged deck drains or relatively flat longitudinal roadway grades.

- *Utility lines* attached to bridge members can cause serious damage if not properly installed and maintained. Utility lines that carry explosive materials must be inspected frequently for leaks. Proper installation requires that the bridge expansion and contraction movements be completely independent of the utility. Allowing support brackets to be indiscriminately attached to the tension areas of steel structures also must be closely controlled to guarantee bridge safety.

- *Build-up of external loadings* on bridge members, other than those considered during design, can cause bridge safety problems. For example, snow and ice loadings in some areas can exceed the design live loading for a

bridge. Bridges easily can be overloaded by the indiscriminate practice of continuing asphalt roadway pavement overlays over bridge decks. This practice not only adds additional loading to the bridge, but it reduces the available railing and curb heights to below minimum standards which in turn causes a bridge to be classified as functionally obsolete.

Other safety considerations also can classify a bridge as functionally obsolete. Bridges with curb-to-curb dimensions less than that of the approach roadway dimensions can be considered unsafe. It has been proven that motorists tend to drive toward the center of the bridge if the roadway clearances are not maintained across the bridge. This obviously is not as dangerous for one-way traffic as for two-way traffic.

A bridge may have a load carrying capacity which is less than that of the type of vehicles demanding the use of the structure. The approach roadway may be able to carry heavy truck traffic, but the bridge may not be able to and still maintain the desired service life.

A few of the most common problems observed by well trained and qualified bridge inspectors have been commented on here briefly. Actual maintenance procedures for the repair of member deterioration will vary with the degree of damage encountered. However, through effective maintenance practices, the service life and safety of our nation's bridge structures can be remarkably improved.

*Donald W. Miller is a Structural Engineer with the Federal Highway Administration, Region 15. He supervises the National Park Service Bridge Safety Inspection Program in the eastern United States.*

## Safety for Special Populations

by Mary C. Rubin



A number of states recently have issued manuals on accessible design for park and recreation facilities. In looking through the Table of Contents of *Mainstreaming Handicapped Individuals—Park and Recreation Design Standards Manual*, published by the Department of Conservation of the State of Illinois, we notice that the word safety does not appear. There are chapters on Historic Sites and Park and Recreation Areas, Lodges and Cabins and Toilet Rooms, and Walks and Curb Cuts. But there is no chapter on safety. Likewise, the American Alliance for Health, Education, Recreation and Dance's *Making Physical Education and Recreation Facilities Accessible to All: Planning, Designing, Adapting* contains no section on safety.

No, the omission of safety is not accidental. And yes, safety is an important consideration when designing park and recreation areas for people with disabilities.

Safety is not listed or addressed separately in either of these manuals simply because safety is not an add-on component of barrier-free design. Rather, safety and safety considerations are built into good barrier-free design. Accessible design is safe for people with disabilities; it is safe for all members of the general public.

### General Principles

In constructing or renovating any building or facility there are two general principles relative to safety which must be considered. The first is to install or include all safety items that protect members of the public in general. Adequate lighting, drainage grading, non-slip surfaces, good ven-

tilation, guardrails along hazardous trails, pedestrian cross markings, etc., must be installed, not for the safety of persons with physical disabilities, but for the safety of all people.

The second principle relative to safety is to follow the recognized Standard for barrier-free design. We don't construct a wheelchair ramp and then add on safety features. Rather we follow accessible design guidelines and construct a ramp with the least possible slope. What is the least possible slope? Design criteria tells us that in new construction the maximum slope is 1:12 and maximum rise per single run is 30 inches (75cm).

We follow the Standard for handrails, width landing, edge protection, and surfacing, etc., and the result is a safe ramp. It is safe for people in wheelchairs. It is safe for ambulatory persons. We, likewise, follow the Standard for parking spaces, curb cuts, entrances, ground and floor surfaces, elevators, water fountains, restrooms, etc., and the result is an environment which can be used safely by all members of the public.

### Costs

Admittedly, it sounds as though we are talking about an ideal situation in which a new park or recreation facility is to be built and for which there is an unlimited amount of money. Money, however, is not that critical. Accessible design, in new construction, is not that expensive. In fact, the additional cost for barrier-free design in new facilities consistently has been no greater than 1 percent of the total cost of the construction. The additional cost usually is much less than 1 percent in exterior

areas where grading can be done.

The usual case, however, is one where an existing facility is to be modified and "made accessible"; this may present situations in which physical constraints prevent the use of ideal design. A second look at barrier-free design guidelines tells us they do include realistic alternatives. Let's return for a moment to the question of the slope of a ramp. As we have seen, the least possible slope is the best. The maximum slope in new construction is 1:12. Yet in an existing situation where a 1:12 slope is physically impossible, the criteria does allow for a 1:10 or a 1:8, although this is much more difficult for people to utilize.

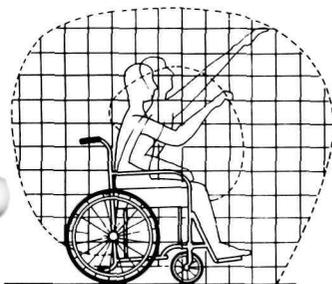
### Guidelines

It may appear at this point that we are concerned only with ramps and persons in wheelchairs. The barrier-free design guidelines consider all environmental elements for all disabilities and elderly people. Space requirements for maneuvering wheelchairs, reaching from wheelchairs, toilet stalls, handrails and grab bars, drinking fountains, and public telephones are all covered. And, these same topics are addressed for persons with walking disabilities, blindness, color blindness, deafness, and other disabilities. Installing a ramp properly does not make a facility accessible to, usable by, and safe for blind people or those with fixed ankle braces. But, following the barrier-free design criteria and warning clues does allow both blind and mobility impaired people safe usage of the facility. If possible, we should always provide alternative routes for changes in level.

Assuming the desire to create an accessible environment, where does one obtain the Standard and design guidelines we have been referring to?

### ANSI and State Standards

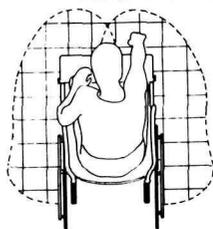
The Standard for barrier-free design was developed by the American National Standards Institute, Inc. at the request of the President's Committee on Employment of the Handicapped. The current Standard, ANSI A117.1



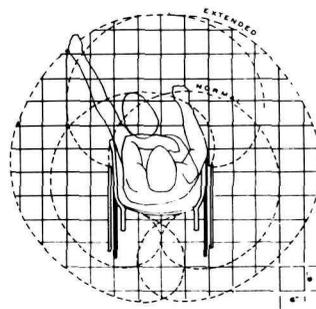
VERTICAL PLANE

NORMAL AND EXTENDED REACH FROM WHEEL CHAIR

(Average Normal Male)



HORIZONTAL PLANE AT FLOOR



HORIZONTAL PLANE 30° FROM FLOOR

*American National Standard Specifications for Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped* is a 1961 version which was reaffirmed in 1971. Other "standards" for barrier-free design, some differing from the ANSI Standard have been advanced. Admittedly, this has led to confusion and varying degrees of accessibility.

Happily, a major effort is now in progress to resolve this situation. The ANSI Standard is undergoing an extensive revision and review process. The revised Standard is expected to be available early in 1980. It will be illustrated and far more comprehensive, and will serve as the nationally recognized and accepted Standard for barrier-free design.

There is available a rather extensive number of publications which contain barrier-free design guidelines, most of which are based on the ANSI Standard. The states of Illinois, Massachusetts, North Carolina, Ohio, and Washington, among others, have published design manuals for all types of facilities.

Manuals on accessible design for park and recreational facilities have been or are being published by a number of states including Georgia, Illinois, New York, Virginia, and Wisconsin.

Private organizations too have issued design guidelines such as *Environmental Modifications for the Visually Impaired: A Handbook*, published by the American Foundation for the Blind. The federal government's Department of Housing and Urban Development funded a study of the American Society of Landscape Architects Foundation; the result is the book, *Barrier-Free Site Design*. And, of course, a number of publishing companies offer books on accessible design.

#### **Input from Handicapped Citizens**

In addition to obtaining and following the barrier-free design Standard, there is another excellent, and too often unused, source of information on good barrier-free design: disabled

people. People who use canes, crutches or wheelchairs, people who have communication or vision disabilities, know what is accessible and what is usable. And, they can provide much insight and assistance to planners and designers. There is the story, now often heard, of the facility which calculated the rather high cost of lowering all their drinking fountains in order that they could be used by people in wheelchairs. The much less expensive and certainly easier to implement suggestion by a disabled person: install paper cup dispensers.

Many people may wonder why all the concern over barrier-free design for so few people? Traditionally our man-made environment has been designed and built in accordance with some concept of the "average" person. If we study the environment, we discover that it really accommodates well only one segment of our population: young adult, healthy, unencumbered people. Children and senior citizens, as well as all aged people burdened down with packages, have difficulty in negotiating steps, revolving doors and many other aspects of our built society. People temporarily disabled, such as those who must use crutches, and pregnant women, likewise, have diffi-

culty in maneuvering safely and freely.

Data from the 1970 census as well as a number of other sources reveal that there are approximately 35 million disabled citizens in this country. The key element in this sentence is not "thirty-five million," it is the word "citizens." Disabled people are citizens. They have the moral, and now the legal, right to participate in the mainstream of life. This includes the active or passive participation in, and use of, park and recreation facilities.

There is increasing evidence that legislators, government personnel, and people in the private sector are recognizing the rights and the needs of disabled people. Park and recreation providers across the nation are committing themselves and their resources to the goal of opening up their facilities and programs to both disabled and able-bodied people. By following the recognized Standard for barrier-free design, they will create environments that are accessible to, usable by, and safe for all of our citizens.

*Mary C. Rubin is Staff Coordinator for the Subcommittee on Recreation and Leisure of The President's Committee on Employment of the Handicapped.*

#### **Sources of Information on Barrier-Free Design**

**American Alliance for Health, Physical Education, Recreation, and Dance**  
1201 16th Street, NW  
Washington, DC 20036

**American Foundation for the Blind**  
15 West 16th Street  
New York, NY 10011

**American Institute of Architects**  
1735 New York Avenue, N.W.  
Washington, DC 20006

**American National Standards Institute**  
1430 Broadway  
New York, NY 10018

**Architectural and Transportation Barriers Compliance Board**  
Mary E. Switzer Building  
330 "C" Street, S.W.  
Washington, DC 20201

**Gallaudet College Library**  
Seventh and Florida Avenues, N.E.  
Washington, DC 20002

**National Center for a Barrier Free Environment**  
Seventh and Florida Avenues, N.E.  
Washington, DC 20002

**National Easter Seal Society**  
2023 West Ogden Avenue  
Chicago, IL 60612  
(material also available from state and local Easter Seal Societies)

**Paralyzed Veterans of America, Inc.**  
4330 East West Highway, Suite 300  
Washington, DC 20014

**President's Committee on Employment of the Handicapped**  
1111 20th Street, N.W.  
Washington, DC 20036

## Conclusion: Importance of Effective Communications in Your Safety Management Program

by John H. Hast



Man's superior ability to communicate his thoughts, ideas, and directions has played an important role in raising him above the level of other animals. Without this ability, everything in our complex world would cease to function. Everything we do depends upon our being able to make our meaning clear to someone else. Getting our ideas to mean the same to others as they mean to us is the essence of communication.

The lack or breakdown of communication—or the “communication gap”—frequently has been identified as one of the major reasons many tasks involving human performance are executed improperly, completed only partially, or never performed at all. Why does this happen? Why is communication such a problem, when it is such an important factor in our development and success? Before these questions can be answered, we first must examine what is meant by communication.

Communication means getting through to people. However, in its application to an organization's safety management program, it means much more than simply putting up posters, passing out rule books, and talking about working safely. Its success depends upon the *attitude* of not only the communicator (the manager or supervisor), but also the listener (the employee).

It's the whole person who communicates, not just what he or she says or writes. Sometimes there is real dispar-

ity between what managers and supervisors say and what they indicate non-verbally.

Real communication includes much more than words. It includes what is not said, shades of meaning and emphasis, facial expressions, vocal inflections—all of the unintended, involuntary styles of communicating that suggest a person's real attitudes.

Since it is almost impossible to disguise these non-verbal tip-offs to what you really feel, make sure you are saying exactly what you mean. It isn't easy to fool people.

### Management's Communication Role

Managers of any organization have a tremendous responsibility placed on their shoulders, and how successful they are depends largely on how well they communicate. This also is true in any sub-function of the organization.

In fact, *the effectiveness of any safety management program is in direct proportion to the effectiveness of communication.* When communication breaks down, when it is ineffective, or if it is non-existent, accidents and injuries will be the end result.

Good, clear communication (giving and getting understanding), whether it involves safety or any other subject, is not necessarily “doin' what comes naturally.” It must be worked at. It involves give-and-take. It requires concentration. It depends as much on feelings as it does on facts.

However, it can be learned. There are known principles of clear communication, and there are some down-to-earth, practical techniques that have proven themselves. They really work. Let's address ourselves to a few of them.

### Professional Management Principles

Among the widely accepted principles of professional management (co-gently crystallized by Louis A. Allen in *The Management Profession*) is the following principle of communication:

*The more often a manager communicates a message, the more certain he can be that it is understood and will be retained.*

While this sounds both obvious and simple, a wealth of knowledge is contained in those few words. People really want to know what is going on and often are de-motivated when they are kept in the dark. The more a person knows about a matter, the more interest and concern is developed. It is very important that management make a sincere effort to keep people informed, since by doing so management is saying, “We think you are important and want to be sure you know what's going on.”

Simply put, management is “getting things done through people.” Communications play a major role in getting the management job done well. Safety plans, for example, cannot be put into effect without communication. Organizational goals and objectives can be reached only by means of mutual understanding. Controls cannot be established, maintained, and effected without good communication. And when it comes to exercising leadership, in accident prevention or any other management concern, nothing is more basic and vital than communication—especially “personal communication.”

### Job Orientation and Instruction

Individual orientation to the job and proper job instruction are two critically important aspects of “personal communication.” Both provide excellent opportunities to communicate safety messages, precautions, and techniques to employees.

- *Individual Job Orientation.* This is where the employee's immediate supervisor can really shine. Here is the opportunity to get the employee “started off on the right foot,” to show him or her that management cares enough to spend some time just being helpful, to avoid letting wrong ideas and habits get started, and to move toward helping the employee do the job safely, effectively, and correctly.

- *Proper Job Instruction.* No facet of personal communication is more important than instructing people in how to do their jobs. The effectiveness of a manager or supervisor depends on how well every member of his or her



*Communicating with visitors is an effective public accident prevention tool.*

NPS

team understands and carries out job tasks.

There is a constant, never-ending need for instruction, training, and re-training. Job instruction is not something that can be done once and forgotten. It is required continuously by change. It is required by newly-hired, transferred, or promoted employees; by new technology, tools, and techniques; and by new policies, procedures, and processes.

When managers do a good job of meeting their responsibility of developing an employee, they also are taking giant steps toward controlling accidents and attendant losses. Accidents are much more likely to be under control when employees are knowledgeable, informed, interested, trained, and skilled.

### **The Power of Criticism**

Every employee needs feedback to be sure that he or she is on the right track. To a large extent, employees must rely on the supervisor for that feedback.

Positive feedback—recognition, praise, reward—reinforces the employee's drive to continue in the proper direction. Negative feedback—criticism, correction, discipline—teaches the employee what not to do. Thus praise and criticism are motivational guideposts of equal importance.

Subordinates need the assurance that they will be told of specific mistakes and will be informed if their general performance falls below par. If they are sure they know how they stand with their supervisor, they have the confidence necessary for decisive action.

From a psychological point of view, people normally expect to be reprimanded when they have done wrong. Criticism relieves their guilt feelings. Some people are not so conscientious and are less prone to feel guilty when they make a mistake. If these people are not criticized, they exploit what they perceive as a weakness on the part of their supervisor.

Therefore, don't overlook the positive power of criticism. Properly used, it can be an important motivation.

### **Communicating With the Park Visitor**

Providing for the safety of the visitors to any park is one of the biggest challenges faced by the park manager. Since most communication with the visitor is in the form of written instructions, warning signs, and posters (all forms of one-way communication), it is important that these messages be clearly understood.

Many visitor accidents are caused by the visitor's total lack of awareness of a particular hazard. People do not react to hazards they do not understand. Any park organization has both the responsibility and a strong obligation to make visitors reasonably aware of the hazards they can expect to encounter while visiting a park. Unfortunately, most park staff members presume that visitors are familiar with and should be able to recognize the hazards in any given park setting.

As in any other accident prevention effort, the logical approach, after identifying a hazard, is to eliminate the hazard, guard against the hazard, or warn of the hazard. Obviously, it is not always possible to eliminate the many natural hazards that exist within a park without destroying the very resource the park organization is there to protect. Because of this restriction, it is much more common for park managers to use the "guard" or "warn" approach to accident prevention.

Often the use of a barrier would intrude too much upon the natural scene so it is necessary to resort to only a warning of the danger. When there is no way an area can be made safe for public use without destroying the resource, it becomes necessary to remove the visitor from the scene entirely.

Since it is necessary to resort to the "warning" approach in many park visitor safety efforts, it is easy to see why communicating with the visitor is so important and one of the most effective public accident prevention tools.

Some suggested methods of communicating safety messages to the park visitor are:

1. *Entrance station contacts.* If the park has controlled entrance stations, park personnel should take advantage of these sites to provide appropriate warning messages to the entering visitor.

2. *Park literature.* Where provided, handout materials should contain appropriate warning messages.
3. *Special handout materials.* The use of special handout materials to warn of specific hazards in the park has proven to be very effective.
4. *Interpretive talks.* These presentations afford an excellent opportunity to maximize safety information conveyed to the visitor. Safety messages can be woven into the script without interference with the primary interpretive goals.
5. *Roadside radio systems.* Low-power radio broadcasting systems can be used to reach entering park visitors with safety messages and other park information via car radios.
6. *Bulletin boards.* Park bulletin boards, often used for the posting of regulations, provide an excellent location for safety posters and safety messages.
7. *Warning signs.* Properly worded and strategically placed signs, which not only prohibit some action on the part of the visitor but state the reason for the prohibition, are a very effective prevention measure.

### Summary

Today, we live in a highly technical world. Hopefully, our communicative skills will continue to advance in proportion to our technical skills. However, this can only occur if we are willing to accept the fact that communicating effectively is an art and not something one does well automatically.

Managers must realize the importance of effective communication and, more importantly, they must realize that as a direct result of poor communications, accident prevention programs will suffer.

*John H. Hast is Director of Safety Management for the U.S. Department of the Interior.*



*Reminder to employees that accidents don't always happen to "other people."*

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### Seven Steps to Maintenance Worker Safety

Maintenance workers encounter many job-related safety hazards. Good safety programs for these park workers are crucial. By following these seven steps, outlined by the National Safety Council, a manager will have made an excellent start in implementing an effective employee safety program.

#### 1. *The manager must want to stop accidents.*

He cannot initiate a safety program half-heartedly, but must sincerely want to stop accidents and be willing to exert the total energy necessary to accomplish this.

#### 2. *Assign someone to help on details.*

Assign a good supervisor to become informed on applicable safety standards established by OSHA, training, accident reporting, and program activities.

#### 3. *Locate the hazards—watch for things that cause accidents.*

Accident statistics will assist in locating safety hazards. Encourage employees to suggest ways of doing maintenance work.

#### 4. *Make the job safe.*

Remove hazards. Make machines, equipment, and operations as fool-proof as possible. Examples of safety equipment are guards for saws, goggles for grinding equipment, and welding masks.

goggles for grinding equipment, and welding masks.

#### 5. *Control employee work habits.*

Teach the safe ways of doing the job. Enforce compliance with safety regulations and make new rules when necessary.

#### 6. *Keep simple safety records.*

Uncover accident causes, check progress, and compare experience with others. Simple records consist of an accident report form and an accident analysis chart. Finally, recognize that records will help reveal injury hazard areas.

#### 7. *Get employees into the act.*

Involve the first-line supervisors and grass roots employees. Make them safety conscious. Solicit their suggestions and utilize their ideas. Devote staff meeting time to safety. Brainstorm and develop innovative approaches to the employee safety program.

These tips and further advice on providing a safe work environment for park maintenance employees can be found in the book *Park and Recreation Maintenance Management*, by Robert E. Sternloff and Roger Warren. Copyright © 1977 by Allyn and Bacon, Inc., Boston.

## Who Can You Turn To ?

The following safety references will prove valuable to every park and recreation area library.

### **Life Safety Code**

National Fire Protection Association (NFPA)

470 Atlantic Avenue  
Boston, MA 02210  
\$5.00

### **Life Safety Code Handbook**

(1976 Code)

NFPA  
\$12.50

### **Fire Protection Handbook**

14th Edition

NFPA  
\$32.00

### **NFPA Inspection Manual**

\$12.50

NFPA

### **NFPA Handbook of National Electric Codes—1978**

\$15.95

### **NFPA No. 37**

"Stationary Combustion Engines and Gas Turbines"

\$3.00

### **NFPA No. 54**

"Installation of Gas Appliances and Gas Piping"

\$4.25

### **NFPA No. 58**

"Storage and Handling of Liquefied Petroleum Gases"

\$5.00

### **Investigating Accidents in the Workplace**

OSHA Pamphlet No. 2288

Occupational Safety and Health Administration

U.S. Dept. of Labor

Washington, DC 20210

No charge

### **Safety—General Safety Requirements Manual**

EM-385-1-1—June 1977

Dept. of the Army

Chief of Engineers

Publications Depot

890 S. Pickett Street

Alexandria, VA 22304

No charge

### **Supervisor's Safety Manual**

5th Edition

National Safety Council

444 N. Michigan Avenue

Chicago, IL 60611

\$15.00

### **Motor Fleet Safety Manual**

National Safety Council

\$12.00

### **Accident Prevention Manual**

for Industrial Operations

7th Edition

National Safety Council

\$36.00

### **Fundamentals of Industrial**

Hygiene (151.12)

National Safety Council

\$12.60

### **Manual on Uniform Traffic Control**

Devices

Superintendent of Documents

U.S. Government Printing Office

\$4.90

### **Safety and Health for Federal Employees**

29CFR Part 1960

Supt. of Documents

U.S. Government Printing Office

\$5.25

### **Construction Safety Handbook**

R500 McGraw Hill/OSHA

McGraw-Hill Book Co.

1221 Ave. of the Americas

New York, NY 10020

\$9.95

### **National Building Code—1976**

American Insurance Association

85 John Street

New York, NY 10038

\$6.00

### **ANSI Standard Specification**

for Making Buildings and Facilities

Accessible to and Usable by the

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All 7.1—1961—R1971

American National Standards Institute

1430 Broadway

New York, NY 10018

\$2.75

### **Building Fire Safety Criteria**

PBS P-59209—July 27, 1965

022-004-00008-5

Supt. of Documents

U.S. Government Printing Office

\$2.75

*Note:* It is advisable to purchase a complete, up-to-date, 16-volume set of the National Fire Codes by the National Fire Protection Association (NFPA), perhaps up-dating with a new set on a 2- or 3-year cycle. The full set for 1979 costs \$95 and is available through the above address.

A number of standards are available from the American National Standards Institute. We suggest you write to its above address or call 212/868-1220 and request the Institute's latest catalog. Then you can determine which standards best satisfy the needs of your own park, not only for the safety function but also for maintenance and other divisions.

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