

FEB 28 1984

Fall 1983
Volume 27/Number 4

CLEMSON
LIBRARY



Solar Kiln to Dry Wood

Woodworker Bruce Forster of Homer, Alaska, along with another woodworker, Charles Simmons, built this passive solar kiln to dry lumber for use in Forster's furniture and wood-working business.

The kiln is designed to hold up to 2000 board feet of 1" lumber which will dry during a 200-hour charge period to 7½ percent moisture content, the ideal level for working wood. Walls and floor are insulated and interior walls are painted with aluminum and black paint. The roof is a clear plastic called Sun-Lite F.R.P., which, unlike clear fiber glass, will not cloud and become opaque. A clouded surface condition diffuses the sun's rays and reduces the efficiency of the solar collector.

Sunlight enters the dryer through the roof and is incident on one of the interior walls. The solar energy is converted to heat and circulated by an electric fan controlled by a thermostat set at 70 degrees F.

The heat evaporates the water from the lumber and increases the relative humidity (RH) of the air. When the RH becomes too high, vents on the rear, or north wall, are opened manually to exhaust the humid air and allow fresh, dry air to enter.

At night, as the dryer cools, the RH will increase as much as 100%. This cool-down and rise in the RH is important. It slows down evaporation from the wood surface. As moisture from the core of the wood migrates to the shell, stress is relieved and the moisture gradient is kept moderate. Relieving the drying



Continued on page 34.

Grist

A publication of the Park Practice Program

The Park Practice Program is a cooperative effort of the National Park Service and the National Recreation and Park Association.

Russell E. Dickenson, Director
National Park Service

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

EDITORIAL STAFF

National Park Service
U.S. Department of the Interior
Division of Cooperative Activities

Kathleen A. Pleasant, Managing Editor

The Park Practice Program includes: *Trends*, a quarterly publication on topics of general interest in park and recreation management and programming; *Grist*, a quarterly publication on practical solutions to everyday problems in park and recreation operations including energy conservation, cost reduction, safety, maintenance, and designs for small structures; *Design*, a quarterly compendium of plans for park and recreation structures which demonstrate quality design and intelligent use of materials.

The information presented in any of the publications of the Park Practice Program does not reflect an endorsement by the agencies sponsoring the program or by the editors.

Articles, suggestions, ideas and comments are invited and should be sent to the Park Practice Program, Division of Cooperative Activities, National Park Service, Washington, D.C. 20240.

For Safety's Sake

All ideas and suggestions shared in the pages of *Grist* are presented as guidelines, not final working blueprints. Be sure to check any device or plan you want to adopt for compliance with national, state and local safety codes.

stresses that develop during the day reduces cracking and warping of the wood that can occur at the end of a drying period.

Kiln temperatures below 70 degrees do not promote drying, while temperatures above 212 degrees F. will cause structural damage. To conserve energy, the fans operate only when the dryer is heated above 65 degrees.

The air circulation system controls the kiln temperature and humidity by adjusting the amount of cool, dry air that enters and the warm, moist air that is expelled. The flow of new air is kept at approximately 5 percent. During the early drying days, the humidity is kept high by keeping the vents closed.

Doors in the east and west walls provide access to the lumber stack for moisture readings. Local green lumber such as birch, spruce and cottonwood is uniformly stacked in the kiln, leaving one foot of clearance on all sides. The ends of the lumber are sealed with a parafin-based paint to prevent quick loss of moisture. In order to avoid injurious rapid drying of the wood during the initial drying process, the moisture content of the lumber should be monitored with a meter.



Maintenance

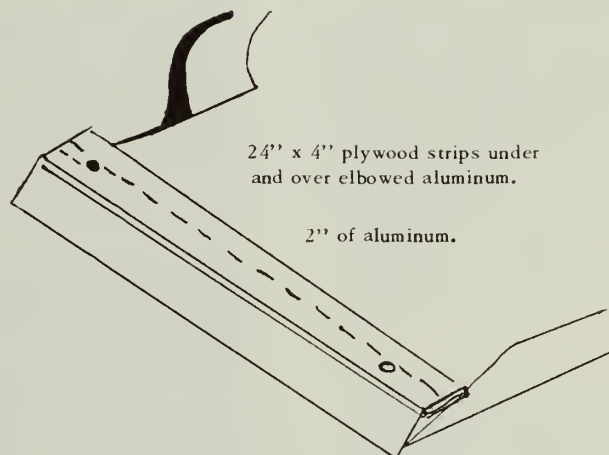
Removable Exhaust Port Shield for Mower

Lincoln Boyhood National Memorial (IN) has a formally landscaped setting surrounded by hundreds of hardwood trees. In the Fall, removing leaves is an expensive and time-consuming chore. The existing lawn mower did not have a closable shield over the exit chute which would make leaf mulching possible. However, Maintenance Worker Elmer F. Stein built a removable exhaust port shield for their Model 275 Hustler lawn mower which allows maintenance workers to mow over the leaves and mulch them, usually in one pass. This reduces and, in some cases, eliminates the need to rake leaves by hand.

Stein used two pieces of scrap lumber ($\frac{1}{2}$ " plywood cut into 24" x 4" sections) and one piece of scrap aluminum (the kind used for skirting mobile homes). The aluminum was 24" long and 6" wide, bent into a 2" x 4" elbow. He also used two 2" carriage-type bolts.

In the Fall of 1980, seven YACC enrollees raked the leaves on the Memorial grounds by hand. They worked approximately 6 hours per day for 25 working days. Stein estimates that, with the aid of his shield, the same job takes one man 4 hours to clear/mulch the leaves (averaging 5 times/trips throughout the leaf fall) which amounts to a considerable savings. Additional savings are realized by using the mulch as a fertilizer for the grounds, thus reducing the need for expensive fertilizers.

Stein received a \$50 National Park Service incentive award for his suggestion.



Traffic Counters

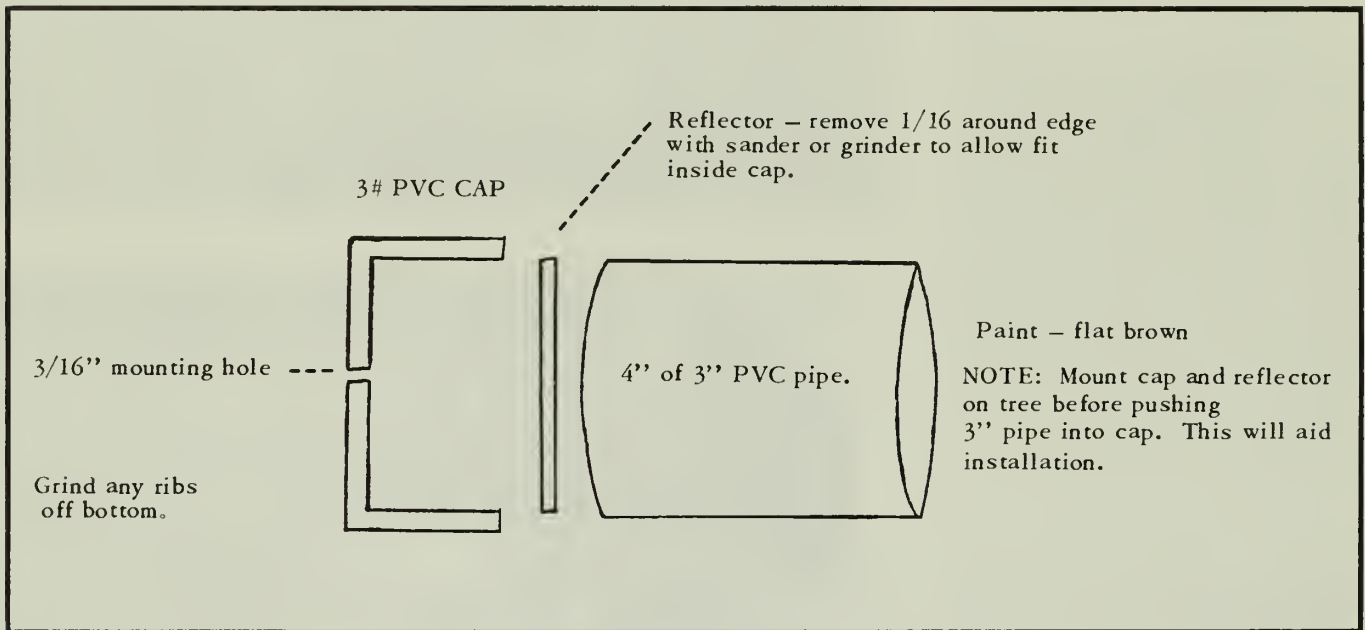
Many National Park Service areas are using infrared light beam traffic counters on roadways and trails. These are often vandalized or removed. While the scanner housing is painted a dull brown and is not readily noticeable, the reflector is easily seen, particularly when vehicle headlights and flashlights light up the reflector at night.

Park Ranger David F. McHugh of the Big Thicket National Preserve (TX) developed this simple shroud which will reduce the visibility of the reflector. Instead of being able to reflect light from an almost 180° field, it can be reduced to 74° (with 4" sides) or 54° (with 6" sides). The shroud can also be painted with camouflage type color, thus making it less susceptible to vandalism. Materials used were: 4" section of 3" PVC pipe, an end

cap for 3" PVC; a reflector and brown paint, at a total cost of \$1.13.

These shrouds will reduce the visibility of the counter reflectors and thereby reduce their discovery and subsequent vandalism. They can be constructed at minimal cost and time (approximately 10 minutes).

McHugh received a \$25 National Park Service incentive award for his suggestion.



Remote Switching Device for Automotive Winches

The operating switches on many of the winches on utility vehicles at Point Reyes National Seashore (CA) are in a fixed position — either mounted on the exterior near the winch itself or inside the cab. This prevents the winch operator from properly monitoring the operation. It can also prove dangerous. Should the cable of the exterior-mounted switch part under a heavy strain, it would whip back towards the operator.

Park Technician Boyd K. Burtnett suggested constructing a simple remote operating switch utilizing nothing more than a push-button switch, a length of

"zip" cord and two alligator clips. Since more of these winches operate through a low-current relay similar or identical to the automotive starter relay, heavy-duty components need not be used.

The push-button switch is mounted on a small piece of wood and the electrical cord is hooked to each terminal. Alligator clips are attached to the cord. The cord can be any length desired and is wrapped around the mounting board when not in use.

To install the remote switch, hook the alligator clips to the relay terminals which lead to the fixed switch. This in no way interferes with the operation of the fixed switch for running the winch. Should the relay not be mounted in a convenient location for hook-up, the same effect can

be achieved by hooking the alligator clips to the terminals of the fixed switch.

The safety of operating winches with fixed switches would be greatly improved with a remote switch because the operator would not have to be in a danger zone should the cable break and whip back. Because the operator is more mobile with a remote switch, the overall safety and efficiency of the winching operation is improved.

This device can also be used by automotive mechanics as a remote starting switch by hooking the alligator clips to the starter relay. This would mean that a second employee would not be needed to turn the engine over to line up timing marks, etc.

A \$25 National Park Service incentive award was presented to Burtnett for his suggestion.

Winter Roadway Signing

Mount Rainier National Park, just outside Seattle in the northern Cascade Mountains, holds the world's record for measured snowfall—1122 inches. An "average" winter will bring approximately 650 inches to the Paradise area of the park. One of the more critical duties performed by Park Rangers throughout the winter months involves analyzing roadway conditions and signing the roads accordingly.

The three basic signs used to reflect roadway driving conditions are TIRE CHAINS REQUIRED, APPROVED TRACTION DEVICES REQUIRED and APPROVED TRACTION DEVICES RECOMMENDED. In past years the TIRE CHAINS REQUIRED sign was permanently affixed to a post and the remaining signs were placed back to back on a single metal sheet and hung on pins over the TIRE CHAINS REQUIRED sign as conditions dictated. This often meant handling a heavy, icy sign over one's head in windy, snowy conditions, and attempting to relocate the sign on 2 small pins near the top of the sign. When no signing was required the entire post and accompanying signs were rotated 180 degrees and pinned in place.

Recently Nisqually District Ranger Gerry Tays designed a new, safer sign that required no independent handling of signs and, consequently, no potential falling sign to injure the Ranger changing the signs. It simply involved making a book out of the sign. Engineering Equipment Operator Larry Hatcher welded each of the three signs to two short metal sleeves which fit over a central post. Each of the sleeves and the central post were drilled to enable the signs to be pinned facing the traffic or out of the way when not in use. All three signs may be pinned out of the way when no signing is required.



Wooden Barrels

The staff at Fort Larned National Historic Site (KS) is looking for wooden barrels to use as refuse containers. The barrels need to have removable lids with a hand hole, and need to be designed so that plastic bags can be inserted into the barrels without being seen from the outside.

They have contacted a private company that will design and produce the barrels if a sufficient number of barrels are ordered to make it feasible. If you have a specific design or if you know of

someone already making this type of barrel; or if you are interested in obtaining them for your park area, please contact the Superintendent, Fort Larned National Historic Site, Route 3, Larned, KS 67550, telephone: 316-285-3571.

Mobile Ladder

When new garbage packers were put into service at the Lake Mead National Recreation Area (AZ-NV), maintenance work on these 13 foot high packers had to be done by using stepladders or extension ladders which caused many moves and some unsafe conditions.

Welder Ralph R. White built a mobile platform or ladder from which maintenance work could be accomplished safely without moving the ladders for each

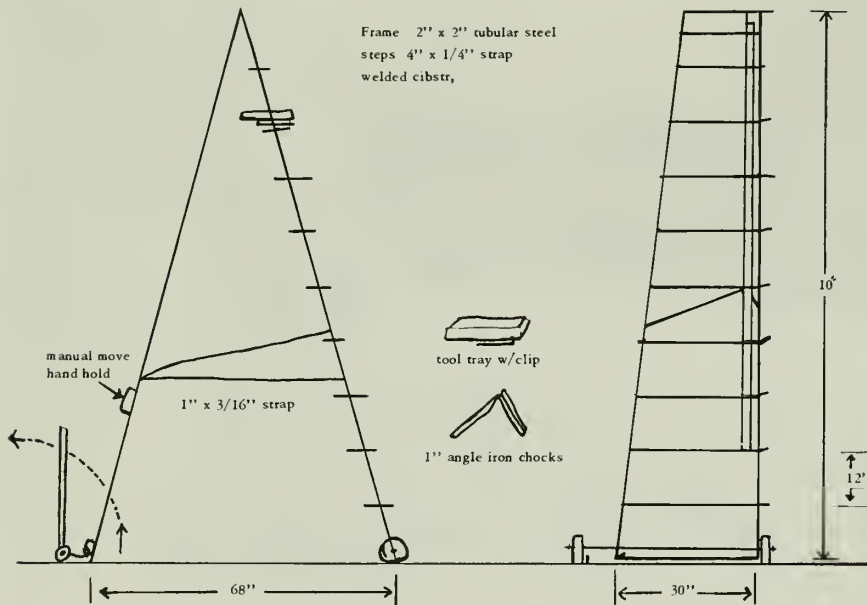
operation. This new ladder was based on the orchard ladders of the Northwest.

One leg is vertical to the floor, remaining the same distance from the truck side from top to bottom. The other leg is approximately 22° from vertical for greater stability. The single support leg is opposite the vertical leg, also for greater stability.

For mobility, small wheels are placed on the ladder frame which raises the base of the ladder to not over an inch from the floor. The wheel on the angled leg can be moved out 8-10" for greater

base width. A small, removable dolly is attached to the support leg for easy moving. Vee-shaped wheel chocks are provided for both wheels. A tray for small tools can be snapped on any of the ladder steps.

Mechanic (heavy duty) John E. Katzenbach stated he had been using the ladder to service the packers and it saves approximately thirty minutes per packer. He says it is also much safer than a regular ladder because of the wide base created by the extendable wheels.



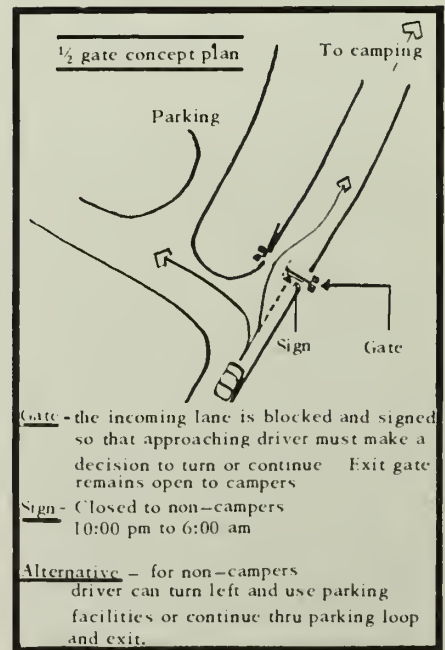
Half Gate Signing

Watercross Spring Recreation Area (MO) had a conflict with vehicles being driven through the camping area and disturbing the tranquility of the campers' outdoor experience. This situation was compounded by the fact that the road "had always been open" for local people to drive through and see what the campers were doing. This administrative problem was very sensitive in that public expectations had to be met for both the campers and the local people.

Efforts to typically sign the area with time restrictions were often ignored, and a solution to these problems was needed.

The Mark Twain National Forest staff developed a half gate system that informed all persons involved what the time restrictions were in such a way that no doubt or possibility of ignorance existed.

Soon after the installation of the half gate concept a few violation notices were issued and contested in the court system. In all cases the judgment was that it was not possible to enter the time restricted area without the vehicle driver being aware of the regulatory requirements. Soon after these court decisions supported the Forest Service position, the problems diffused and a more normal atmosphere of cooperation between campers and locals began to exist.



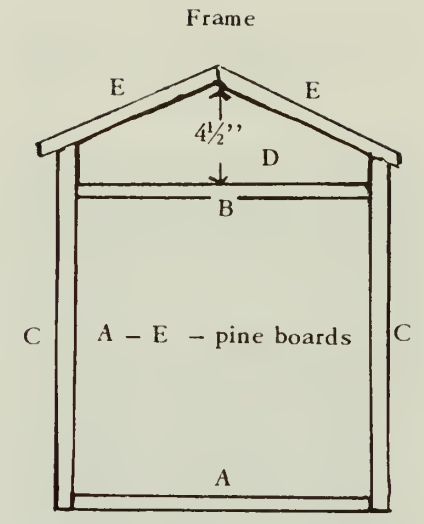
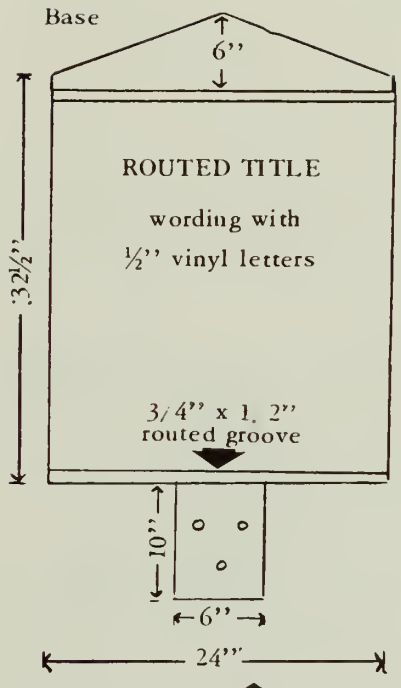
Historical Site Markers

Greenwood Furnace State Park (PA) Superintendent Lawrence S. Hoffman contributed this design for an historical site marker which is totally enclosed for weather protection. All historical information was put on a board with 1/2" vinyl plastic letters and covered with 6 coats of exterior polyurethane coating.

The only routing on the sign was the initial descriptive heading. Old shaker shingles were used for the roof and the door has a hand-made wooden sliding latch. Tuf-nuts were used to secure the sign to the post.

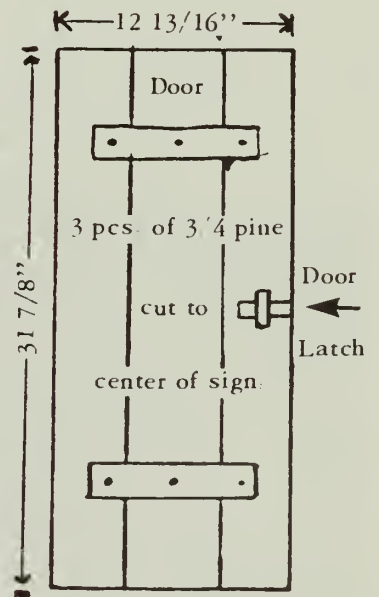
Lumber used for the sign was oak. The exterior is all 3/4" rough pine which was salvaged from an old building. The signs were installed on a 6 x 6 post cemented into the ground.

Hoffman said that by using the vinyl letters, they reduced the amount of time that the sign could be made and should the letters peel, you can replace them and recoat with more polyurethane.



2" x 8" oak boards cut to size and glued and clamped together.

Note: best to lay the 8" or 6" center board down first and glue together and cut roof peak after gluing.



Locating Underground Utilities (Part I)

General Engineer Wayne Veach of the National Park Service's Mid-Atlantic Region shares this method of determining the location of underground pipes which he learned from Chief of Maintenance Vic Martin of Petersburg National Battlefield (VA).

Required materials are two *steel* rods approximately 36" long and 1/8" in diameter. Bend each rod 90° at a distance of about 9" from one end.

The rods are held by the short legs, one in each hand, short legs vertical and long legs pointed forward, horizontal, and parallel

about a foot (comfortable distance) apart. One long leg should be held slightly higher than the other.

The method of support is very important since the rods must be free to pivot with little interference. The bend must be clear of the fingers and the fingers *cannot* grasp the rod. The rod is supported in each hand by one side resting against the forefinger and the other side farther toward the rod end against the middle of the palm close to the wrist. The palm of the hand is turned forward and the weight of the long leg holds the short against the palm so it won't fall.

It takes some practice to hold the rather delicately balanced rods parallel and horizontal while

slowly walking. However, when the rods pass directly over the underground pipe, conduit or similar disturbance in the ground, the long legs will swing to *cross* each other. There is no way to determine how deep an object is, but the rods have detected pipe as far down as 20 feet. Veach says that for some reason, not everyone can do this, but for those who can it can be an interesting and useful tool. He also observed that when you closely approach another person, the rods will either cross or diverge. This method certainly works for Veach for he has determined the locations of direct burial electric power lines, drainage tile lines and underground septic tanks.

Locating Underground Utilities (Part II)

Landscape Architect Dennis Paul Fehler and Fire Management Officer James W. Martin of the Mark Twain National Forest in Rolla (MO) have another suggestion for locating underground utilities.

They suggest using a metallic, color-coded warning ribbon when installing a utility. This warning ribbon would be detectable from the ground surface (by metal detector, similar to what treasure hunters use) without the need for unnecessary mechanical disturbance. After installation an entire utility system could be plotted with flags on the ground surface and only the appropriate area be disturbed for repairs or additions.

Also, the visual warning ribbon would warn those involved with inadvertent digging that they are in the immediate area where a utility conduit exists and that caution must be exercised.

This warning ribbon would prevent accidental damage to underground utilities and harm to those involved in the relocation process by providing an electromagnetic and visual warning marker of the actual utility trench location. It would also correctly identify underground situations so that future generations will know what is buried and the exact point-to-point path.

This idea would be especially useful for:

1) archeologist - to relocate boundaries of important sites or specific points such as shovel test. This would allow documentation of sites with special and

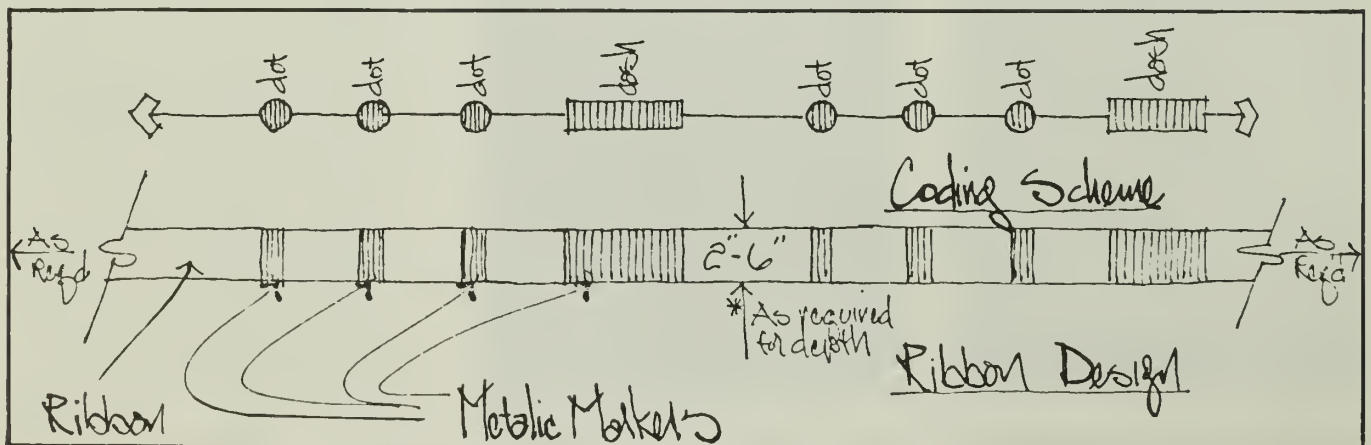
appropriate artifactual warnings;

2) engineers - to provide necessary markings of all underground utilities;

3) landscape architects - to help relocate utilities when proposing design changes and when making new ground surface proposals;

4) foresters - to locate temporary corners, boundaries, etc.;

5) soil scientists - to locate soil pits for later evaluation.



Sand/Salt Storage Container

Storing sand or salt mixtures on steep driveways or dangerous hills to have ready during emergencies and inclement weather was difficult to do at Cuyahoga Valley National Recreation Area (OH). Although piles of sand were covered with plastic or canvas, strong winds would often blow the protective covering off and expose the sand to rain. In winter, the wet sand would freeze solid, making it impossible to shovel. Also, the piles would become buried under large accumulations of snow or drifts.

Maintenance Mechanic Foreman Kerry C. King solved this problem by constructing a storage container for a sand/salt mixture. King took an old 55-gallon drum and cut a section out of the barrel with a cutting torch. He welded one end of an old hinge onto the cut-out section and the other hinge's end to the barrel. He cut two pieces of sheet metal for the supporting legs and welded them to the underside of the drum. The longer legs were

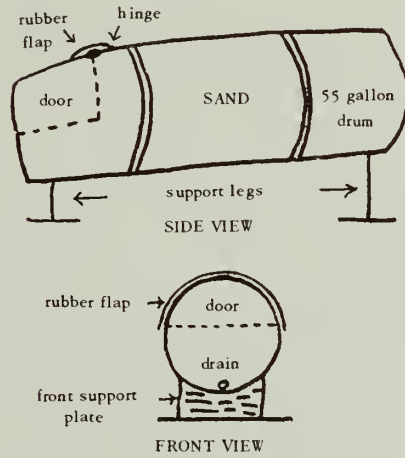
put in the back and the shorter ones in front for ease of loading and removing sand, and also for shedding water and snow from the container. He wire-brushed and painted the container and installed a rubber flap to shed water and seal the top joint. The entire construction process took approximately 3 hours.

The materials used were: A 55-gallon drum; two pieces of 1/4" scrap metal (16" x 6"); one piece of old rubber floor mat (24" x 8"); one hinge; 8 metal

screws; and one pint of spruce green paint. All these materials were recycled junk except for the screws and paint which were purchased from GSA at a cost of \$3.00.

King estimates a savings of approximately \$2500 per year for the cost of wasted sand, travel time, labor for breaking up frozen sand, replacing torn or lost canvas, etc.

An \$80 National Park Service incentive award was presented to King for his suggestion.



Chain Vise For Maintenance Technician's Van

Maintenance Technician Earl Slygh of Clifty Falls State Park (IN) needed a device to hold pipe while he was working in the field. When using pipe wrenches

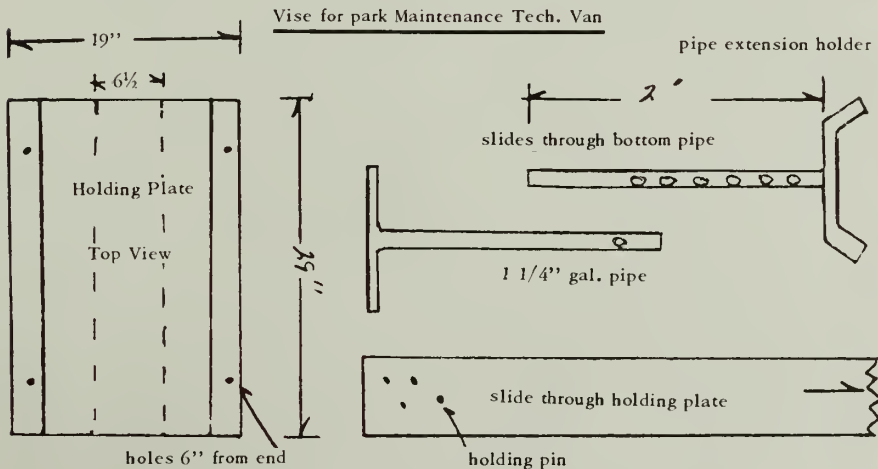
and pipe cutters, he found that they were too inconvenient when he tried to pull against each wrench.

Slygh had an old motor platform that was not in use. He cut a hole in which he could slide a 6" piece of channel iron through and on this he mounted a small chain vise. It stands about 20"

off the ground.

Materials used were a 6" x 5" channel iron, an 8" x 2" channel iron plus one top screw chain vise (BC-410 rigid) for a cost of approximately \$50.00.

This device saves gas and time by eliminating the need to drive back to the service area and is very convenient for on-site jobs.



Safety

Safety Award

The National Park Service was the recipient of the Secretary of the Interior's Annual Safety Program Award for 1982. This selection, in competition with other Department of the Interior bureaus, was made through a comparison of each bureau's improvement in its OSHA, injury, illness, accident, and motor vehicle accident rates for calendar year 1982. The award was presented in a ceremony at the Departmental Occupational Safety and Health Seminar at the Anaheim, California, Convention Center on March 21, 1983. Mr. Ronald Piescki, Director, Office of Acquisition and Property Management for the Department of the Interior presented the award for the Secretary. NPS Western Regional Director



Howard Chapman accepts Safety Award from Ronald Piescki.

Howard Chapman accepted the award for NPS Director Dickenson.

In accepting the award, Mr. Chapman expressed the pleasure and pride in achievement by the National Park Service for this recognition. He acknowledged the efforts of all employees in the Service, but especially the safety community, in attaining the improvements in the NPS safety programs indicated by the award.

The award was formally presented to Director Dickenson at his staff meeting of May 27, 1983, by NPS Chief, Branch of

Safety Management, Richard Wilburn.

This award is based on an improvement over a three-year period in the National Park Service accident rates. It represents a reduction in losses from damaged equipment and employee lost time from the job due to injury or illness. This reduction in losses is reflected in an increased efficiency in park operations as fewer hours of employees not reporting for work and equipment not being in a shop for repairs results in higher output.

Ranger Information and Safety

Grand Canyon National Park (AZ) attracts millions of visitors each year, many of whom come into contact with Protection Rangers. Protecting visitors is directly related to the information and knowledge the Protection Unit receives regarding criminal activities and identification. If a Protection Ranger knew descriptions of all major wanted lists (10-29's) in Arizona, better protection could be afforded for the Ranger and the visitor. However, there were no systematic or regular means of transmitting

area-wide wanted lists to Protection Rangers.

Law Enforcement Technician Steven E. Schneider (formerly with the Grand Canyon NP) knew that the Department of Public Safety transmitted a 10-29 broadcast every morning regarding stolen vehicle descriptions and wanted felons. Schneider suggested that this daily broadcast be received through the Grand Canyon's existing teletype terminal without modifications or additions. The printout would be posted on the Ranger Operation Bulletin Board, thus providing vital information to the Protection Rangers.

Schneider's suggestion would

enable the Protection Ranger to better prepare himself or herself for a potentially hostile situation; insure visitor safety by eliminating the visitors or the suspect from the arrest scene; increase morale among Protection Rangers by effecting good arrests; increase credibility with outside agencies; and enhance working relations with the immediate public.

Scaffolding Safety

While working on a sectional scaffolding, William B. Kozlowski, masonry worker at Fort Larned National Historic Site (KS) realized a safety hazard existed when he used a single pulley and rope to pull up material. The pulley was attached to one corner of the scaffold and he had to stand underneath to hoist up material. Bricks could come loose and hit him.

If Kozlowski moved to one side to pull, the increased angle plus the weight of the material being hoisted tended to pull the scaffold over. Also, once the material was pulled up to working level, he had to reach over the safety railing to retrieve the often heavy load. This sometimes caused a loss of balance.

Kozlowski corrected this safety hazard by developing a swivel type "T" with pulleys on both

ends. This provides the operator with ample clearance from falling material (up to 8 additional feet) and also enables the operator to swing the material in and onto the scaffold platform, thus eliminating the need to reach over the railing.

A \$100 National Park Service incentive award was presented to Kozlowski for his idea.

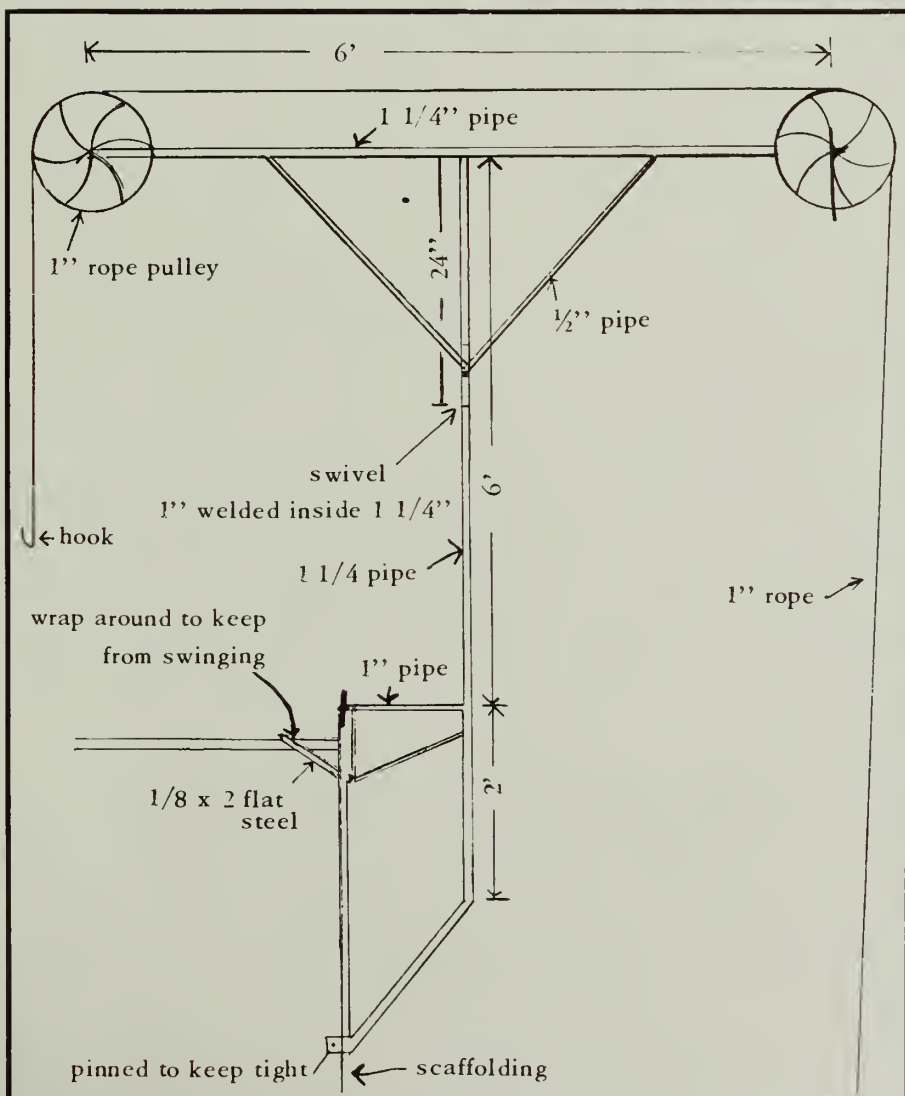


Welding/Cutting Table

Seasonal Maintenance Laborer Burton L. Rust of Pipe Springs National Monument (AZ) constructed this handy welding/cutting table to use in the maintenance shop.

He first removed an old campsite grill from a fireplace. He cut 4 lengths of 1 1/2" pipe to 32" and welded them onto the corners of the grill. He also welded a 1/2" nut on one leg 3" from the floor using a 4" carriage bolt. This serves as a leveling device for uneven floors.

This sturdy table took little time to construct and has proved highly useful in the maintenance shop.



Administration

Project Instruction Sheets

Mrs. Bernice E. Harris, secretary-stenographer with the National Park Service's Midwest Regional Office in Omaha, Nebraska, devised this efficient and effective instruction sheet for use in her office.

The instruction sheet is used on all correspondence and/or work projects by persons initiating the project. It eliminates lengthy and repeated discussions and provides documentation on exactly what is to be done, by and for whom, and the time frame involved. The reverse side can be used for further instructions if necessary. It can be easily modified to suit one's particular office situation or needs.

Mrs. Harris was presented a \$25 National Park Service incentive award for her suggestion.

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Special Populations

The following ideas appeared in the May 1983 issue of An Accessible Heritage, a National Park Service newsletter which shares ideas for making the National Park System more enjoyable for handicapped visitors.

Park Brochure

Every park should have an accessibility guide that tells the handicapped visitor or potential visitor what is and is not accessible to him or her in the park. It is also good to put some of the information, even if only in brief form, in the park brochure.

In the event that the brochure will not be revised for some time, this can be done simply and inexpensively by ordering hand rubber stamps. For example, a small boxed statement with the wheelchair logo can be stamped in a convenient open space in the brochure's text.

Another way is to stamp some helpful information directly on the brochure map. Such messages can then be added in the next printing. In the meantime, a quantity sufficient for the handicapped visitors can be hand stamped as needed.



Picnic Tables

The most common way to adapt a picnic table for wheelchair use is to extend the top 18" to 25", so that the chair can be pulled up to the extended side or end.

The C&O Canal National

Historical Park has altered some of its tables by extending one end a full 48" and adding another support at the new end. One chair can sit at each side, with another at the end, with space to spare,

