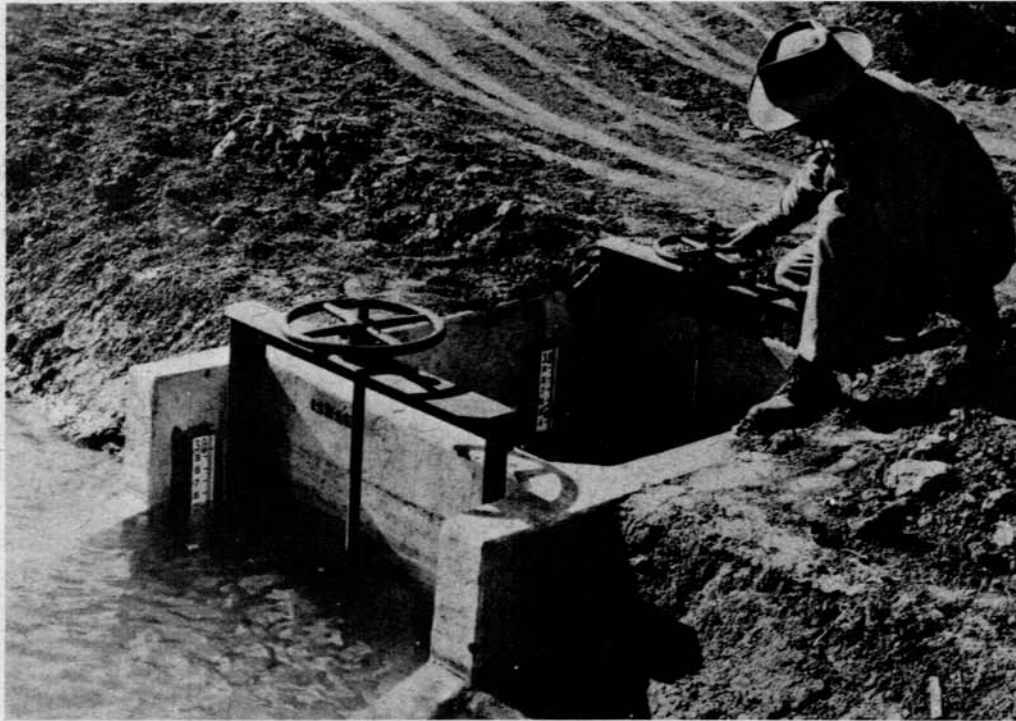


# WATER OPERATION AND MAINTENANCE

BULLETIN NO. 90

DECEMBER 1974



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UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION

The Water Operation and Maintenance Bulletin is published quarterly, for the benefit of those operating water-supply systems. Its principal purpose is to serve as a medium of exchanging operation and maintenance information. It is hoped that the reports herein concerning labor-saving devices and less costly equipment and procedures, will result in improved efficiency and reduced costs of the systems for those operators adapting these ideas to their needs.

To assure proper recognition of those individuals whose suggestions are published in the bulletins, the suggestion number as well as the person's name is given. All Bureau offices are reminded to notify their Suggestions Award Committee when a suggestion is adopted.

Any information combined in this bulletin regarding commercial products may not be used for advertising or promotional purposes and is not to be construed as an endorsement of any product by the Bureau of Reclamation.

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Division of Water Operation  
and Maintenance  
Engineering and Research Center  
Denver, Colorado 80225



COVER PHOTOGRAPH:

A single-barrel constant-head orifice turnout on the Conchas Canal, Tucumcari Project, Southwest Region, Amarillo, Texas. This is a typical constant-head orifice turnout installation and is usually placed at right angles to the main canal. Photo PX-D-35546

UNITED STATES DEPARTMENT OF THE INTERIOR  
Rogers C. B. Morton  
Secretary

BUREAU OF RECLAMATION  
Gilbert G. Stamm  
Commissioner

WATER OPERATION AND MAINTENANCE  
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INTRODUCTION

Why flow measurement of water for irrigation, municipal and industrial uses is most important, is told in a very informative article starting on page 1.

As described in the safety article on page 3, your gas welder and you can become a deadly combination if the proper procedures for handling both are not followed faithfully.

"Remember the Hot Stove Principle When You Discipline" is the title of this article pertaining to personnel management and can be found on page 5.

Grounding of portable electrical tools is most important and failure to do so could result in a very serious injury as the article on page 7 indicates.

An article on page 9 gives some specific facts on the comparison of dry land farming to farming under irrigation.

Valve cover lifting is made easy by a lifting dolly shown on page 10. It was designed and fabricated by employees of the State of California, Department of Water Resources.

A unique snow stake and post puller, an idea submitted by an employee of the National Park Service and described in an article on page 14, makes a hard job somewhat effortless.

OSHA stands for a Federal law called the "Occupational Safety and Health Act." The National Safety Council's compliance action plan for the act and two related articles can be found starting on page 16.

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## MEASUREMENT OF WATER IN PRESSURE CONDUITS<sup>1</sup>

Because of their many advantages, the Bureau of Reclamation is becoming increasingly interested in the use of underground pipelines to transport water. Where pipelines are used in place of open canals, evaporation and seepage losses are reduced, waterlogging of lower lying lands is eliminated, weed prevention and removal costs are eliminated, operation and maintenance costs are reduced, more of the available land can be devoted to cultivation, and there is greater safety to animal and human life.

The initial cost of installing pipelines of course is somewhat more expensive. However, as the value of water and land increases, and the availability of low-cost labor to handle maintenance decreases, the use of pipelines becomes more economically feasible. Thus, as the Bureau installs more pipelines, accurate flow measurement of the valuable water in these lines becomes increasingly important.

Measurement of flows in pipelines can be accomplished by a wide variety of methods, and the choice of a method for a particular installation will depend upon prevailing conditions. The accuracy of flow measurements in pressure conduits by means of properly selected, installed, and maintained measuring equipment can be very high.

### Watermeter Comments

Meters designed for measuring flows in closed conduits are generally classified as to type of operation, that is, the displacement type, the velocity type, or the bypass type. These meters usually record total volume making it unnecessary to compute volume from observed discharge records. Elimination of need for computing volume from discharge observations is particularly advantageous where water is sold on the volume basis. Many flowmeters, however, may be equipped with auxiliary apparatus to record the instantaneous flow or discharge.

Water measured in closed conduits with mechanical meters must be free of foreign matter. Meters should be inspected regularly to detect abnormal wear, corrosion, or changes that would tend to alter the meter's accuracy. The greatest limitations of the many volumetric meters and adaptations of flowmeters are their relatively high cost and their relatively short life under adverse operating conditions.

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<sup>1</sup> Reprinted in part from the Water Measurement Manual, Second Edition, Revised 1974. For sale by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Price \$5.80. A manual pertaining primarily to the measurement of water for irrigation projects, by the Bureau of Reclamation.

## Methods and Types of Meters

Various methods and types of meters are used today for the measurement of irrigation, municipal and industrial water and a few of the most common are listed herein:

### Meters and Indicators

Venturi Meters and Flow Nozzles, Orifice Meters, Pitot Tubes, Current Meters and Trajectory methods such as the California pipe method.

### Other Methods for Rating Discharges

Salt-Velocity, Color-Velocity and Radioisotope.

### Calibration of Turbines, Pumps, Gates, and Valves

It may be desirable or perhaps necessary on some irrigation distribution systems to measure the flow by means of the turbines, pumps, gates, or valves through which it flows. This may be easily done if the structure is calibrated; and the calibration may be made in the field using an approved flow measuring method, or in the laboratory using hydraulic models. Properly prepared curves are a reliable means for obtaining accurate discharge measurements.

In the case of turbines or pumps, discharge-versus-power relationships are acceptable. The relationship may be determined by measuring the average output or input during the period in which discharge measurements are made for various load conditions. Suitable curves or tables may be developed from these test data to show the rate of flow,  $Q$ , that occurs for specific types of operation. Curves may also be prepared from model test data by the manufacturer. Due care must be taken to account for changes in the efficiency of the machines due to long service or other deteriorating factors.

For gates and valves, discharge-versus-head, curves are established for various gate openings. These may be determined by measuring the rates of flow at given gate or valve openings under specific head conditions. By operating over the full range of openings and heads, data may be obtained for establishing families of curves. Generally, the curves would show the rates of flow in second-feet that occur through the gate or valve at specific openings, expressed in percent of full open, for the pertinent operating heads. These curves may also be prepared from model test data.

\* \* \* \* \*

## YOUR GAS WELDER AND YOU<sup>1</sup>

### Deadly Combination

"Safety is for sissies or is it?" The two biggest causes of accidents with acetylene welding equipment are carelessness and ignorance, according to Herb Hawkins of Phoenix, Arizona. Mr. Hawkins demonstrated the hazards of unsafe handling of gas welding torches at the Southwest Safety Congress in Phoenix.

### Makeshift Repairs Dangerous

When repairing hoses ONLY use BRASS repair fittings designed expressly for this purpose. Never use a piece of copper tubing as a repair link. When acetylene gas comes in contact with copper an explosive situation can be created.

Proper care of your cylinders is essential, he said. Never leave your cylinders standing around with their safety caps off. Cylinders must be securely fastened to prevent them from tipping over. If a cylinder tips over and the valve is knocked off, "that cylinder will take off like a rocket."

Protect cylinders from extremes of temperature. Herb told the audience, "for every degree over 72 degrees, the pressure will increase 5 lbs." All cylinders are equipped with a safety disc which will relieve the pressure before the cylinder bursts. It is important to keep cylinders shaded, because the sudden release of welding gasses would be dangerous.

### Exploding Torches

Oil and torches don't mix. Regulators and valves on acetylene torches should NOT be lubricated with oil. The use of oil on a regulator or valve can cause an explosion.

NEVER lay an acetylene cylinder on its side while you are using it, Mr. Hawkins said. Acetylene cylinders are made differently from all other cylinders. The cylinder contains acetone and if this acetone enters your regulator, the regulator could explode.

Be sure that you use the correct tip for your welding job. Don't use a small tip to cut a big hunk of steel. The large volume of gas needed to cut a heavy piece of steel cannot pass through the orifice of a

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<sup>1</sup> Reprinted by special permission of the Editor from the Arizona, Farmer-Ranchman, dated May 1974.

small tip, according to Mr. Hawkins. If you turn up the pressure too high when using a small tip, the gasses will back up into the regulator and blast it apart.

Mr. Hawkins demonstrated the explosive power of small amounts of acetylene gas and oxygen. He filled a very small balloon with the two gasses. When he touched the balloon with a flame, the resulting explosion rocked the Civic Plaza Convention Center. If this explosion had taken place inside the regulator, pieces of regulator would have flown out like shrapnel.

Many flashback hazards can be easily prevented by installing an inexpensive check valve on your torch. This valve prevents gasses from backing up into your regulator.

Your torch is safe if you follow a few common sense precautions. You must release the adjusting screw on your regulator before opening the cylinder valve, and open the valve slowly. These practices prevent the buildup of heat which creates an explosion hazard. It is advisable to stand to one side of the regulator while opening the valve. The blast from an exploding regulator almost always comes out through either the front or the back of the regulator.

Purge the oxygen and acetylene lines before lighting. This is accomplished by turning on the oxygen and acetylene valves separately and allowing a little gas to flow. Purging insures that there is no mixed gas inside the regulators, lines or torch tip which could cause a flashback.

Turn on the acetylene first and light it before turning on the oxygen. The burning rate should be set with the acetylene valve only. Use a spark lighter to light your torch.

Never use oxygen or acetylene as a substitute for compressed air. Dusting your clothes with oxygen is extremely hazardous. "You will burn up," according to Mr. Hawkins. The slightest spark will ignite oxygen-saturated clothing and turn you into a human torch.

\* \* \* \* \*



REMEMBER THE HOT STOVE PRINCIPLE  
WHEN YOU DISCIPLINE<sup>1</sup>

It has been said that a manager has authority but he should seldom use it and never display it. That is interesting but not of much use. The manager knows he has to exercise discipline over his employees but he wishes to do it in such a way that the employee will not become angry or sullen. It is not the kind of discipline that we know exists in the armed service where to disobey a direct order brings immediate threats of physical punishment or court-martial. This would never work in business, but there are occasions when authority has to be exercised.

How does one discipline in the office environment? One of the dictionary definitions for discipline is: "to train or develop by instruction, an exercise especially in self-control." The objective is to train and develop the subordinate for the future, not to punish for the past. Nevertheless, we need a set of rules or principles to guide us in administering discipline. One of the better methods is called the "hot stove principle." Following is an explanation of its seven major points.

1. It Forewarns -- A hot stove sizzles and, therefore, forewarns the person who comes near it. It should not be a surprise to a subordinate when he is disciplined. Your actions should be predictable in this circumstance.

2. It Reacts At Once -- There is no delay in getting a reaction from a hot stove. It burns at once and you know it. To delay your reaction to an action of a subordinate is tantamount to approving that action. Like the stove, you must react at once. This places an extra burden on the manager because he does not have time to deliberate but must react at once to the situation.

3. It Is Consistent -- A hot stove always burns. The keyword is "always." You must be consistent. If your employees detect that you vacillate from left to right or show favoritism, you have already lost some of your effectiveness. Be consistent.

4. It Is Impersonal -- A stove burns anyone who touches it. The keyword is "anyone." It does not discriminate between people. Everyone gets treated the same. This point is a crucial one to the administration of discipline. If one person gets away with an act and another one doesn't, you have lost credibility with your subordinates.

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<sup>1</sup> Reprinted from Reclamation Safety News, Second Quarter 1974. The article was printed by permission from the December 1972 issue of THE OFFICE, and written by David A. Radius, Vice President, Management Systems, Old Kent Bank & Trust Co., Grand Rapids, Michigan.



5. It Doesn't Apologize -- After a stove has burned you, it is silent. To apologize for the obvious is to detract from its meaning and purpose. If you attempt to soothe the employee, you nullify all the benefits that could have been derived from the discipline. Do not apologize for your actions.

6. It Doesn't Get Emotional -- A stove has no emotion. When administering discipline you must have no emotion. It is not an emotional matter. It is a factual matter. The employee may be emotional; you must not be. It would only feed the fires of his emotion further. Remain calm.

7. Nor Make An Example -- You are not a court of justice trying to deter further crime by severe punishment. Punishment must fit the crime. Each individual case is different and, therefore, must be treated accordingly. You get one chance to make an example of an employee; you won't get another. YOU be the example!

When faced with a situation where an employee is breaking a work rule, remember the hot stove principle. It will remind you of what your actions should be.

\* \* \* \* \*

MONITORING AND CONTROL  
of  
WATER RESOURCES

The Belgian government has installed a system for centralized monitoring and control of water resources. A total of 240 monitoring stations has been installed on rivers, canals, and the sea shore to log water levels. Data are channelled to a central "305" Siemens process computer in Brussels. The computer determines the position of locks and weirs for optimal water flow throughout the water system. Through this system, the most economical utilization of water resources as well as avoidance of flooding and low water levels will be assured.

In Roselies on the Sambre river an experimental station for monitoring water pollution has been installed. Water temperature, salinity, pH, Redox potential, COD value, translucence, and emission of sunlight are measured. It is planned to install 200 of these monitoring stations throughout the water system. They will be connected to a "330" computer at Brussels, alongside the "305" water-flow computer. It will then be possible to pinpoint individual polluters and to take care of local accidental pollution situations by increased water flow.

\* \* \* \* \*

## SHOCK-PROOF YOUR ELECTRIC TOOLS and EQUIPMENT

(Reprinted by permission from a recent issue of GRIST, a publication of the National Conference of State Parks, Washington, D.C.)

Electric shock can result in serious injuries and burns, in mental problems which far exceed the original physical injury caused by arrested breathing, and even in death from electrocution.

All portable electric tools should be grounded, preferably at the plug by a 3-wire conductor. If the wall outlet is not adapted for a 3-prong plug, or if a 2-wire extension cord is being used, an adapter should be provided and all users should be instructed to attach the grounding "pig-tail" wire to the center screw of a properly grounded wall receptacle plate or other system ground. The sketch below (Figure 1) shows the proper system to follow when using an electric drill, and the sketch on page 8 (Figure 2), shows what could happen if the wrong procedure is followed.

All stationary electrical equipment should be grounded--this is particularly important in damp areas or near metal fixtures, tables, and counters.

Internal electrical faults cause current to short-circuit harmlessly to equipment ground in systems with green-jacketed grounding conductors.

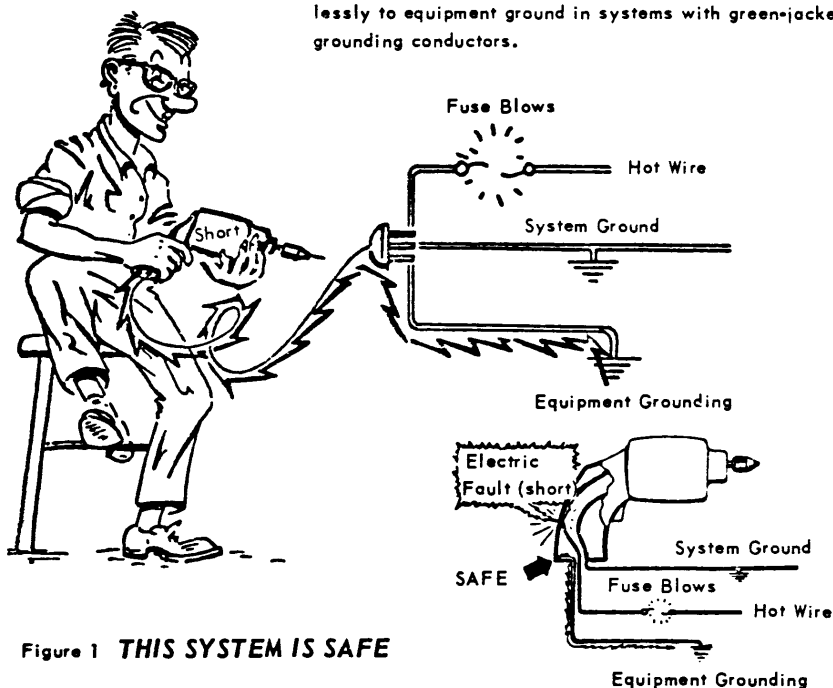


Figure 1 **THIS SYSTEM IS SAFE**

Figure 1



Because white-jacketed system grounds cannot conduct electricity from short circuits to the ground, they do not prevent the housing of faulty equipment from becoming charged. Therefore, the person who contacts the charged housing becomes the conductor in a short-circuit to the ground.

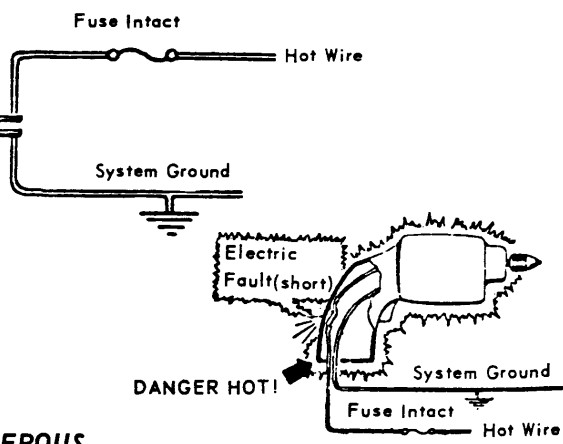


Figure 2 **THIS SYSTEM IS DANGEROUS**

Figure 2

A regular inspection and maintenance schedule for all electrical equipment should be adhered to.

Only weather-proof type sockets for extension cords, drop lights, and other lighting equipment should be used in wet or misty locations.

Cords and other conductors for electrical equipment should not be wrapped around or otherwise allowed to come in contact with water pipes, steel fixtures, or metal equipment.

This information is adapted from National Park Service publication, Information to Prevent Accidents.

\* \* \* \* \*

"Finish each day and be done with it. You have done what you could. Some blunders and absurdities no doubt crept in; forget them as you can. Tomorrow is a new day; begin it well and serenely, and with too high a spirit to be cumbered with out old nonsense."

Ralph Waldo Emerson

## WATER--Our Golden Future

Enough crop land is under irrigation in North Dakota these days to prove that there is a substantial improvement in crop yields and dollar income from irrigated land over dry land farming.

A comparison has just been made for some crops raised at either the Carrington Irrigation Experiment Station or at the Oakes Irrigation Trials as against the average yield for all North Dakota dry land farming. There are some startling differences.

At Carrington, irrigated land produced 67.5 bushels of durum per acre for a gross crop value of \$392 per acre. This was \$224 above the \$168 realized on the average dry land durum acre, which produced 29 bushels. The unit price was figured at \$5.80, the average North Dakota price as reported by the North Dakota Crop and Livestock Reporting Service.

The average yield from dry land for hard spring wheat was 28 bushels per acre, and the Carrington station produced 62.7 bushels of this crop. There was a \$158 per acre balance in favor of irrigation with wheat figured at \$4.54 per bushel, for a gross of \$127 from dry land and \$285 from irrigated land.

Even the most valuable crop per acre on dry land, potatoes, almost tripled in value under irrigation. With spuds figured at \$3.25 per hundredweight, the yield from 145 hundredweight on the dry land acres was \$471. Near Oakes, irrigated acreage produced 377 hundredweight, for a gross income of \$1,225, or \$754 more than from dry land acres.

Corn raised on dry land averaged 57 bushels per acre and 148 bushels on irrigated land at Oakes, for a \$198 extra income. Corn for silage at \$12.50 a ton produced only \$64 on dry land acres, but \$300 on irrigated acres.

Also at Oakes, soybeans ran 23.5 bushels on the dry land average, but 50 bushels on irrigated land. At \$5.50 per bushel, that added up to \$146 extra income for the irrigated land.

The same dollar balance was noted for all other crops tested, including flax, edible beans, sunflowers, sugarbeets and alfalfa hay. With 1973 being a drought year in much of the state despite the overall good crop harvested by the farmers, the benefits of irrigation are dramatically demonstrated by these comparative yields. In some years the difference won't be as pronounced because years of plentiful moisture will cut the gap in production between the dry land average and the irrigated acre average. Still, 1973 returns show that irrigation does pay off.

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Reprinted from the Department of the Interior, Bureau of Reclamation, PRESS INFORMATION. News item from the Aberdeen American News, Aberdeen, South Dakota.

## THE LIFTING IS EASY<sup>1</sup>

Even though, in Figure 3 below, Jerry Farmer looks ready to raise that cover with one finger, he would have quite a lift of it. These are the covering plates sealing the openings to deluge valves at Wind Gap Pumping Plant, and they weigh more than 200 pounds each.



Figure 3

PX-D-75383

Prying a cover up with a pick or a bar and then skidding it aside presents the constant hazard of the cover falling down into the shaft. There is also a very good possibility that the thing might clank down onto someones foot or hand. Even if such methods of removal were perfectly safe, it would still not be a one-man operation. All of the danger was reduced, or eliminated entirely, by the designing and fabrication of a simple lifting dolly. The dolly not only makes cover moving safe, but the whole thing can be done with ease.

### Description

Dolly design was by Bruce Johnson, Associate O&M Engineer, aided by the drawing skills of Mike Gereghty, Student Assistant. Both for strength and for ease of movement, the dolly is composed of a number of triangular shapes. The following illustrations, by Mike Gereghty, on pages 11 and 12, tell more than ten-thousand words, at least. Materials consisted of steel tubing and pipe. Three standard dolly wheels, with a tongue arrangement on one of them, provide flexibility of movement. The lifting secret is an ordinary medium-sized winch from a boat trailer. All fabrication is by welding, and was done in the shop at the San Joaquin O&M Center. Results have been completely satisfactory.

### Operation

Instead of slipping a disk or spraining a finger, the operator only has to roll the dolly into place over a cover plate, pay out the winch

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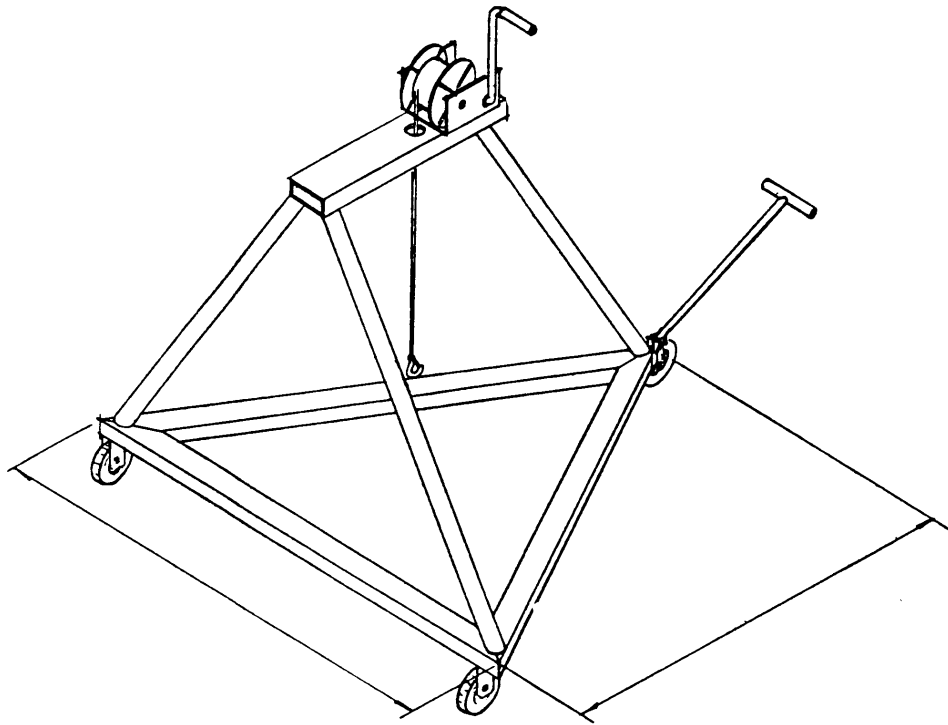


ILLUSTRATION (A)

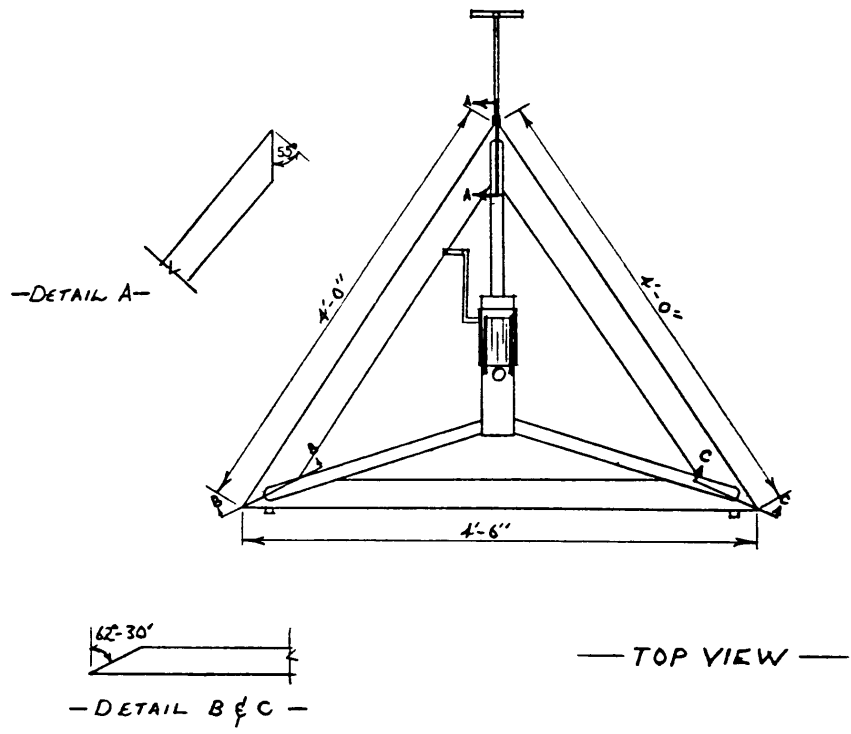


ILLUSTRATION (B)

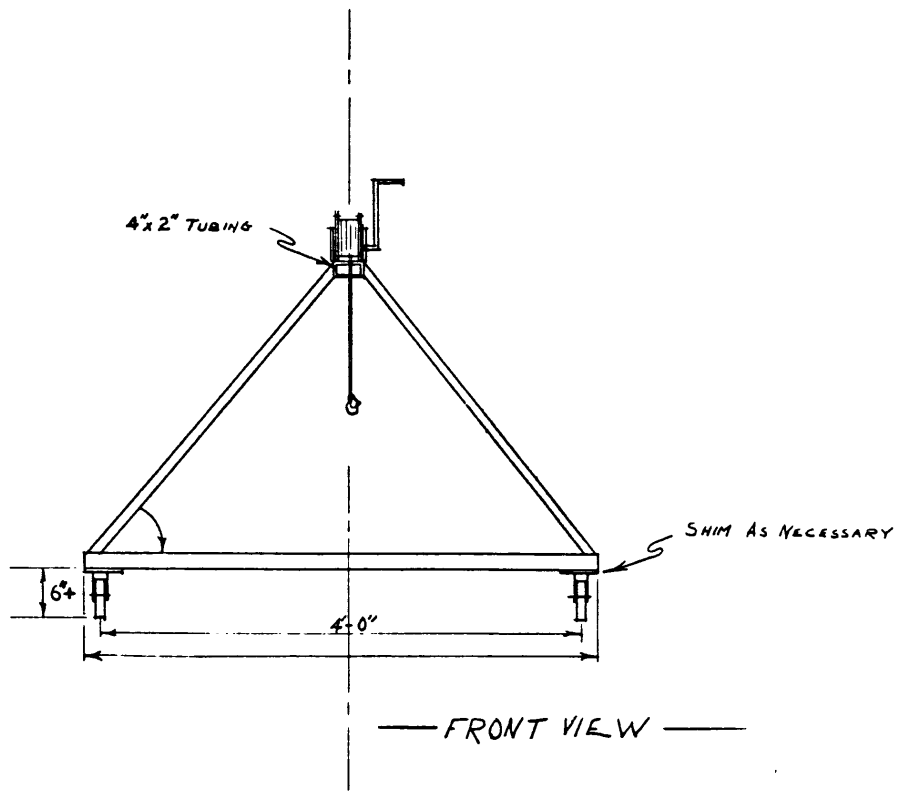


ILLUSTRATION (C)

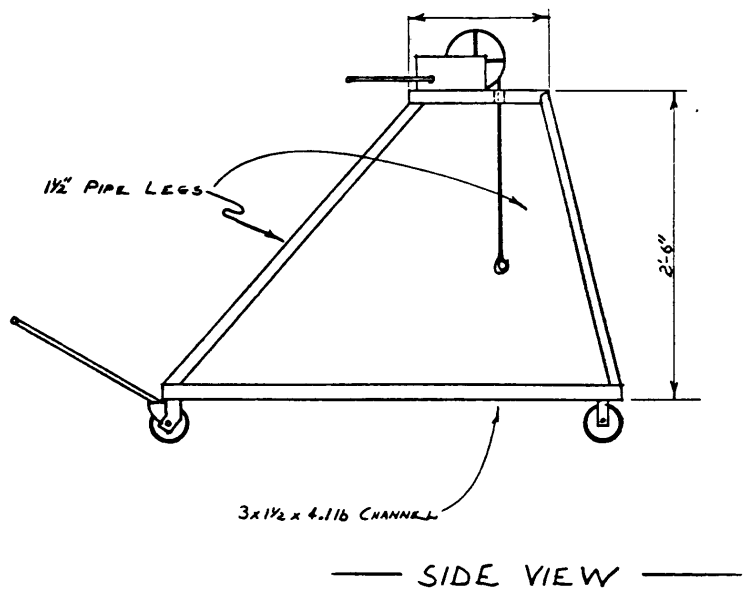


ILLUSTRATION (D)



cable, and hook the snap-hook to the lifting ring. One man can wheel and guide the dolly into place. One man can also crank up the heavy plate until it rests snugly against the triangular base of the dolly.

Figure 4 shows Billy McDougle, and operator at Wind Gap, just after he has cranked up the cover and is about to take the dolly handle, and Figure 5 shows the cover pulled away from the access hole. Once the steel coverplate is snugly drawn up against the dolly there is no slew or sway no matter how the operator may haul the thing around. To replace the cover, simply reverse the process. Roll the dolly back in position with one wheel on either side of the shaft. When the cover is directly over the opening, unlock the winch and lower away. A little bouncing of the winch handle serves to re-seat the cover as it should be.

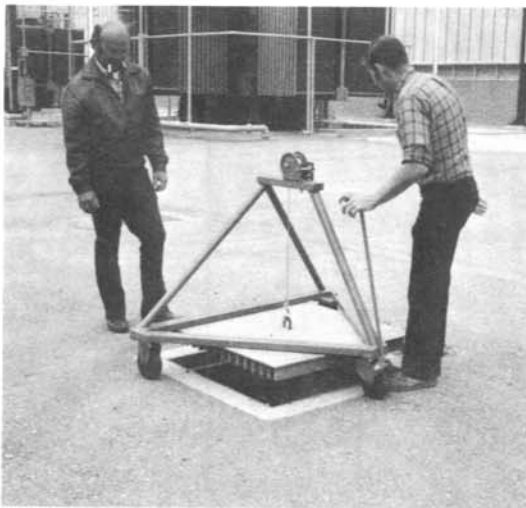


Figure 4

PX-D-75381



Figure 5

PX-D-75382

If additional information is desired regarding this unique lifting device, please write to the State of California, Department of Water Resources, P.O. Box 388, Sacramento, CA 95802

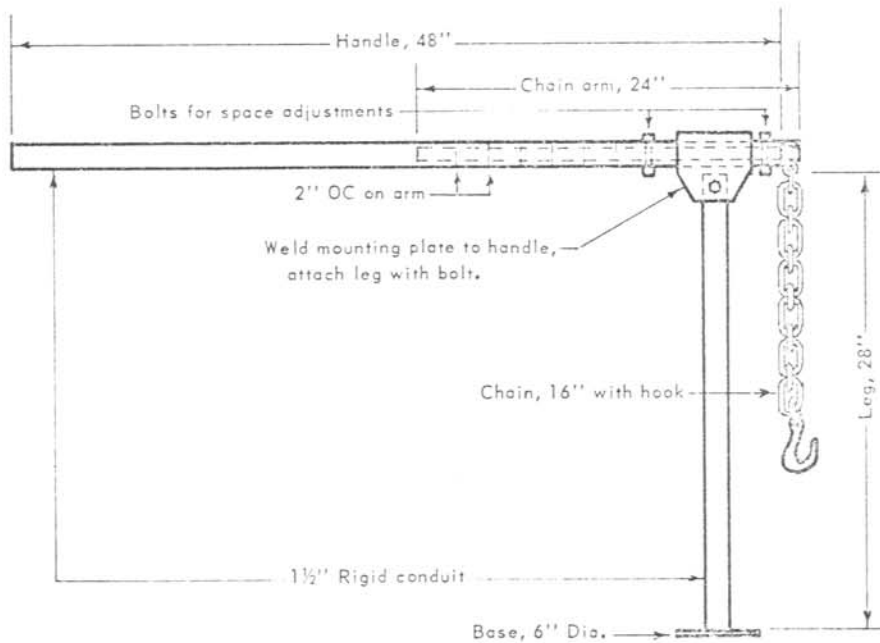
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## SNOW STAKE/POST PULLER

(Reprinted by permission from the May/June 1974 issue of GRIST, a publication of the National Conference of State Parks, Washington, D.C.)

Archimedes said it first: with a lever and a fulcrum he'd move the world! And that's what Mr. Walter L. Gracey's snow stake and post puller is all about. Given his well-designed and well built device-- which embodies the Greek's lever/fulcrum principle in a portable, easy-to-use form, snow stakes and sign posts come out of the ground with ease, even when that ground is hard and frozen.

Mr. Gracey, a vehicle operator at Yellowstone National Park (Wyo.), noticed the man-hours and effort spent in the snow stake/post pulling chore in previous years, and decided to do something about it. That something (see sketch below), was a base leg mounted on a 6-inch in diameter base plate. Pivoted to the top of the base leg is a 48-inch long handle, from which protrudes an arm to the end of which is fastened a 16-inch long chain with hook.



Sketch

To pull a stake out of the ground, the chain is wrapped around the stake and leverage exerted by pushing down on the opposite end of the handle; the top of the base leg being the fulcrum for the lever.

Walt Gracey's device provides for varying degrees of leverage by changes in the length of the chain arm. That is, this arm telescopes into the handle and may be lengthened or shortened in two inch increments .... with the greatest leverage, for the toughest posts, being provided when the chain arm is fully telescoped. For easier, faster jobs, the chain arm can be lengthened, causing the chain to exert upward force on the post relatively faster, but with relatively more force being required on the operator's end.

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#### ECONOMIC NEED FOR DITCH CLEANING<sup>1</sup>

In irrigated regions an estimated water loss of 10-35% is possible through seepage, evaporation, aquatic weed plants, and weeds along the ditch banks. Weeds along rivers, canals and ditches have been estimated to waste 25 million acre-feet of water annually in the seventeen Western states where water is the most valuable. This water represents money in these areas. For this reason good ditch maintenance is of the utmost importance to the progressive farmer as well as the irrigation ditch company.

In regions where excessive rainfall is a problem, good drainage ditch maintenance can be one of the most important contributing factors to a good crop. Land which is not properly drained will never yield a good profit regardless how good the other management practices are performed.

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<sup>1</sup> Reprinted from a recent issue of a Departmental News Release.

## OSHAct Compliance Action Plan<sup>1</sup>

-- From National Safety News

- A positive safety and health program with full employee involvement is probably the best way to avoid employee-relations implications built into OSHAct.
- Bid and contract specifications for equipment and devices must provide for safety and health regulations requirements.
- Only competent, qualified suppliers should be considered eligible to submit bids.
- A written, specific safety and health program should be required, developed, and supported by the entire organization. Special warnings, instructions, and orders relating to job safety and health should be developed and published as needed.
- Meetings of all safety and health related personnel should be held regularly and periodically to review safety and health problems and to formulate solutions.
- Job detail and standard procedures should be established for every high hazard job, including safety and health instructions, warnings, and practices. Workers must be trained to follow them.
- Worker compliance with OSHAct rules, regulations, and standards should be made a condition of employment in all union contracts and for all non-union employees.
- Document all cases of warnings and non-compliance by employees before taking disciplinary action to prevent counter-charges of discrimination.
- Survey all operations to assure that they meet standards. Make sure serious hazards are controlled. Substitute, eliminate, isolate, or otherwise get rid of hazards or control them. Self-inspection tours should be scheduled regularly and discussed in meetings of safety and health personnel.
- Plan ahead for any possible OSHA inspection. Don't get caught without a safety program of some sort, no matter how small your operation.
- Put clauses in all purchases, service and other contracts that all materials and equipment purchased and services provided, including construction undertaken, will meet OSHAct safety and health standards.

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<sup>1</sup> Reprinted from the Reclamation Safety News, First Quarter 1974. A safety publication printed by the Department of the Interior, Bureau of Reclamation, Engineering and Research Center, Denver, Colorado.

- If you manufacture a product or provide a service, make sure your product or service meets the requirements.
- Constantly monitor state and federal standards, rules, regulations, and procedural developments and proposals. Make sure your interests are represented on standards' writing committees. (Long run implications are much more serious than the present short-range. Completely new concepts and philosophies are yet to be developed and put into effect. They could be costly, even ruinous.)
- The line organization will constantly be facing the safety and health controversies that may arise at any work site. Intensified supervisory training must assure that first-line supervision knows what the new employee rights are, and what procedures are to be used to handle them.
- Because the effects of OSHAct cut across all management areas of responsibility, be sure that a key management official is made responsible for coordination or related matters. Don't keep it within the safety department; set up an internal communications system up and down the chain of management.
- Programs to meet environmental standards should be integrated with the on-the-job program, because the type of technical expertise is similar.
- Employees, consumers, users, etc., will no doubt become increasingly more claims conscious when and if job-related injuries or illnesses occur due to provable violation of OSHAct safety and health standards. Protect yourself by acting now.
- Establish a good faith posture with your employees. It will be to your advantage when and if an OSHA Inspector calls.

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#### OSHA RULINGS AFFECTING BUREAU OPERATIONS

##### Two Job-Safety Violations Found in Tennessee Death Case

--From National Safety Council  
Construction Section Newsletter

There can be two violations of the Federal Job Safety Act's "general duty" clause in a single place of employment, the Occupational Safety and Health Review Commission (OSHRC) ruled. The 2-to-1 decision overturned a prior ruling by an administrative law judge which sustained only one general duty violation out of four such charges made by the Labor Department's Occupational Safety and Health Administration (OSHA) against a research and development contractor at a development center in Tullahoma, Tennessee.

OSHA charged the company because they allowed employees to enter a heat treatment furnace operated with argon (an inert gas that replaces oxygen in the atmosphere) without conducting atmospheric tests, without providing suitable emergency rescue equipment, without disconnecting the piping system used to convey the argon into the furnace and without providing an external method of ventilating the furnace once the argon had entered it. OSHA cited these infractions as four separate general duty clause violations following the December 10, 1971 death of two workers in the furnace. OSHA proposed a \$700 penalty for each of the four charges. The general duty clause requires employers to furnish a place of employment "free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees."

The company maintained that there could be only one general duty violation arising out of a single incident and contested the OSHA charges. The matter was assigned to a Review Commission judge who held a two-day hearing in Manchester, Tennessee ending April 21, 1972.

The judge ruled that there could only be one charge of general duty violation, namely failing to conduct atmospheric tests to determine the oxygen content of the furnace before allowing employees to enter it. He also found that external means of ventilation were available at the time of the employee deaths and that the other two charges of rescue equipment and disconnection of the pipe merely contributed to the one actual hazard. The judge assessed a \$900 penalty for the offense.

Before becoming final, however, the judge's ruling was directed for review by the three-member, presidentially-appointed Commission.

Author of the decision, Commission member Timothy F. Cleary agreed that only one charge of general duty violation could be made if there was only one hazard but stated that two hazards existed - the absence of suitable rescue equipment as well as an oxygen-deficient furnace. The Commission, therefore, found two violations and assessed penalties of \$600 for the rescue equipment and pipe disconnecting offense and \$900 for the argon violation.

Commission member James F. VanNamee concurred that the general duty clause had been violated twice, but reasoned that the company had done so by failing to "furnish to each of its employees" a healthful work-place; first by not providing one employee with a purged and tested furnace and second by not providing two other employees with suitable rescue equipment.

In a separate dissenting opinion Chairman Robert D. Moran stated that only a single general duty violation could ever exist at one place of employment at any one time. He also added that he did not think any violation had been proven in this case.

#### Trenching Violation Penalty Reduced

A proposed \$10,000 penalty for an employer's willful failure to shore, slope, or brace a trench was reduced to \$5,000 by the Occupational Safety and Health Review Commission because the employer had no history of previous violations and the willful violation was not so severe as to require the highest possible penalty.

The job was inspected by the Labor Department following an employee complaint that a trench was neither sloped nor shored. Although no shoring, sheeting, or bracing was used in the trench, a "mule," which is a portable steel trench shield, was used at least intermittently on each day. Out of a total of approximately 16 hours covered by the eight-hour workshift on each day that men were working in the trench, the mule was out of the trench for approximately five hours.

The employer's foreman was apprised that the trench did not comply with the applicable occupational safety and health standard and that without the mule being in the trench, adequate precaution for employees' safety was not being taken. In spite of that knowledge, he authorized removal of the mule for intermittent periods on two successive days.

Considering that the number of employees exposed to the risk of injury was small, the duration of their exposure was short, the exposure was intermittent, and partial precautions were taken to reduce the risk of injury, the probability that an accident resulting in injury would occur was significantly reduced, the Commission concluded. Accordingly, the Commission found that although the gravity of the violation was substantially more than minimal, it was not of such a severe nature as to require the highest possible penalty.

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