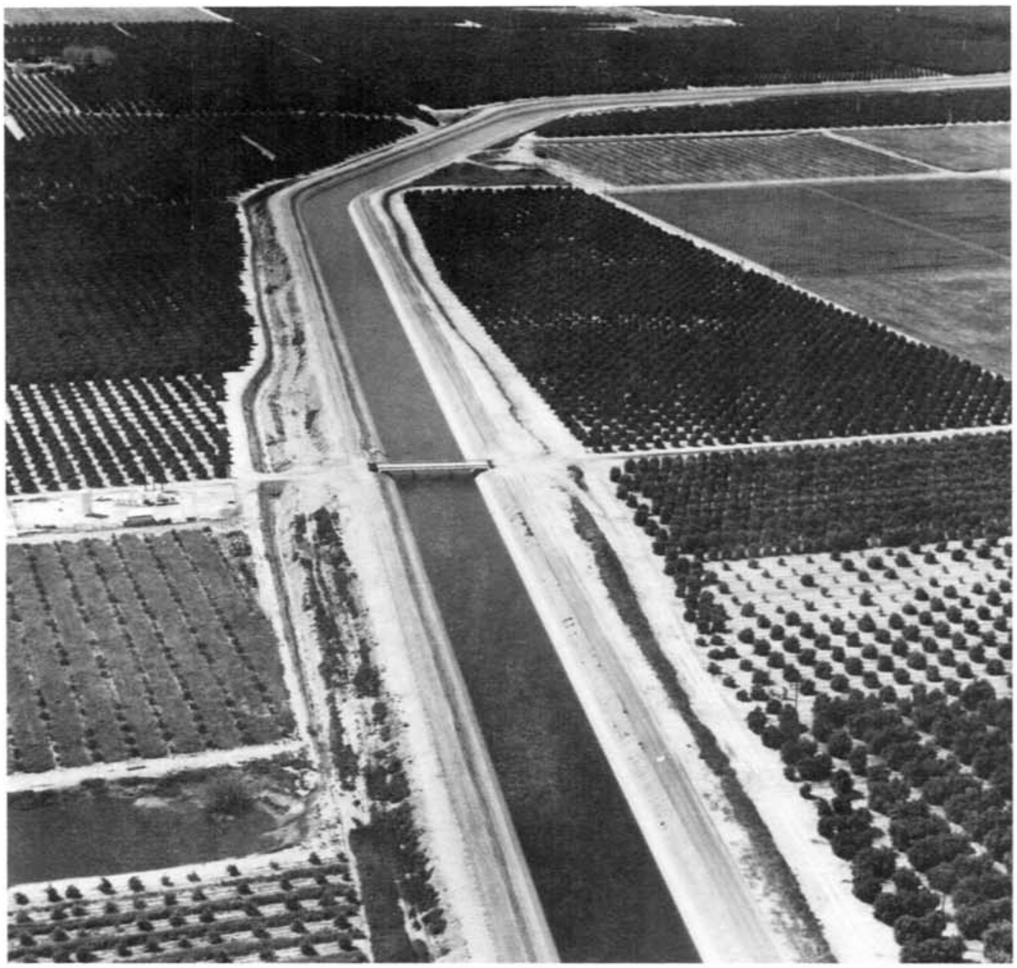
# WATER OPERATION AND MAINTENANCE

**BULLETIN NO. 103**

MARCH 1978



## IN THIS ISSUE



**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 laborsaving 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 contained in this bulletin regarding commercial products may not be used for advertisement 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:

Friant-Kern Canal, Central Valley Project, California. Aerial view of the canal north of Orange Cove, California. The canal carries water from Millerton Lake southerly for supplemental and new irrigation supplies in Fresno, Tulare, and Kern Counties. The canal, 244.6 km (152 mi) long, terminates in the Kern River about 6.4 km (4 mi) west of Bakersfield.

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION

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## INTRODUCTION

The article on page 1 describes a process used for transporting emergency drought relief water through existing systems to water user districts on the Friant-Kern Canal.

Electrical accidents not involving overhead powerlines are on the increase. The article beginning on page 6 points out precautionary measures and preventive actions on electrical safety of irrigation equipment.

A money-saving workable solution for replacement of gasket-like rubber stripping for sealing edges of steel, rollup doors at half the cost of dealer replacement, is described on page 13.

The article on page 14 describes the use of a readily available substance called "bentonite" as sealing material for ponds and irrigation ditches.

On page 16 is an article on a safety ladder, designed and put in operation at the Buena Vista Pumping Plant. It provides easy access over projecting air coolers that are attached to the outside of the housing of the main units.

Various solvents and sprays can have a detrimental effect on the integrity of plastic-type hard hats as described in the article beginning on page 18.

Two automobile safety tips are found on page 20.

# EMERGENCY DROUGHT RELIEF ON THE FRIANT-KERN CANAL[1]

Faced with a severe shortage of surface water supply normally delivered from storage behind the Friant Dam, several of the irrigation districts on the Friant-Kern Canal had to search for other sources of water in order to provide enough water to prevent losses of valuable permanent crops.

As a result of this search, it was discovered that water normally delivered and used by rice growers in the Sacramento-San Joaquin River Delta might be made available for purchase by these irrigation districts. However, problems developed with the sale of this water and it appeared for a while that the whole plan would fail. Then, the Bureau established a "waterbank" by which they would purchase excess water such as the rice water mentioned above and would sell and deliver this purchased water to irrigation districts that had permanent crops in need of water.

Several of the irrigation districts on the Friant-Kern Canal, who had been trying to purchase the Delta water from the rice growers, became interested in purchasing the waterbank water. Purchase and delivery costs of this water would run as high as \$81 per 1000 $m^3$ (\$100 per acre-ft). The Bureau received contracts for $3.7 \times 10^6$ $m^3$ (3000 acre-ft) of this waterbank water. The problem of transporting this amount of water from the source, in the Delta, to the user districts on the Friant-Kern Canal had to be solved. The State of California agreed to transport the water south, in the California Aqueduct to the delivery point of the Cross-Valley Canal, operated by the Kern County Water Agency in Bakersfield. Kern County Water Agency agreed to transport the water through the Cross-Valley Canal to the turnout of the Arvin-Edison Water Storage District. The conveyance system is illustrated schematically in figure 1. Arvin-Edison Water Storage District, in turn, agreed to permit the Bureau to place a dike across their intake canal so that the water could be backflowed to the Friant-Kern Canal. Arvin-Edison Water Storage District was required to continue to deliver water from the turnout from the Cross-Valley Canal to their own facilities. Additionally, they had to deliver the waterbank water through the same turnout to backflow into the Friant-Kern Canal. To accomplish this, it became necessary to block off one bay of the turnout. The waterbank water was then siphoned into the intake canal upstream of the earth dike through two 600-mm (24-in) diameter siphons. The siphons were designed by personnel from the Fresno Office (CVP) and

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[1] Written especially for this publication by the Fresno Office, Central Valley Project, California.

were built in a local machine shop. They were installed by Bureau personnel from the Friant and Delano Field Branches.

The next major obstacle was to transport the water back up the Friant-Kern Canal to the irrigation district turnouts. To accomplish this hydraulically, it was necessary to reverse-flow the Friant-Kern Canal and to pump the water over the Shafter check located at milepoint 137.20, a distance of 23.5 km (14.6 mi) upstream from the Arvin-Edison Intake Canal turnout. It was also necessary to pump the water over the Equalizing Reservoir check located at milepoint 121.51, a distance of 26.9 km (16.7 mi) upstream of the Shafter check. The gates of Poso Creek check structure located at milepoint 130.03, a distance of 11.6 km (7.2 mi) upstream from the Shafter check, were raised clear of the water so that the water could flow upstream.

After much research, personnel from the Engineering Branch, Fresno Office (CVP), were able to locate two large vertical lift pumps that could be adapted to pump the water over the Shafter and reservoir check gates. These two pumps, rented on a monthly basis, were driven by large LP gas engines through an angle-drive gear box. The optimum capacity of these pumps was 1.7 $m^3/s$ (60 $ft^3/s$); however, the head conditions available reduced the output. The platforms on which the pumps, gearheads, and engines were mounted were designed by the Engineering Branch, Fresno Office (CVP), and were built in the shops of the Orange Cove and Lindsay Field Branches. The platform at the Shafter check was built 5 m (16-1/2 ft) high, 6.1 m (20 ft) long, and 2.7 m (9 ft) wide. It consisted of six 200-mm (8-in) diameter pipes, properly braced with angle iron for stability on which a frame made from 300-mm (12-in) wide flange beams were mounted and solidly welded. The whole structure rested on large wooden pads to protect the concrete structure from damage.

The other platform placed downstream of the reservoir check was similar in size and design, except that it was 6.3 m (20-1/2 ft) high; the difference being due to larger gates being installed at the reservoir check. The total cost for design, materials, and labor for these two platforms was about $20,400. Photographs of the completed pump and installations are included at the end of this report.

After installation and pumping startup, several of the irrigation districts were unable, for various reasons, to accept delivery of the contracted waterbank water, thus reducing the original quantity of $3.7 \times 10^6$ $m^3$ (3000 acre-ft) to $1.65 \times 10^6$ $m^3$ (1338 acre-ft). The quantity of water was pumped in less than a month. After the pumping operation was completed, the pumps and platforms were removed from the Friant-Kern Canal. The pumps were then returned to their owners and the platforms were placed into storage for possible future use.

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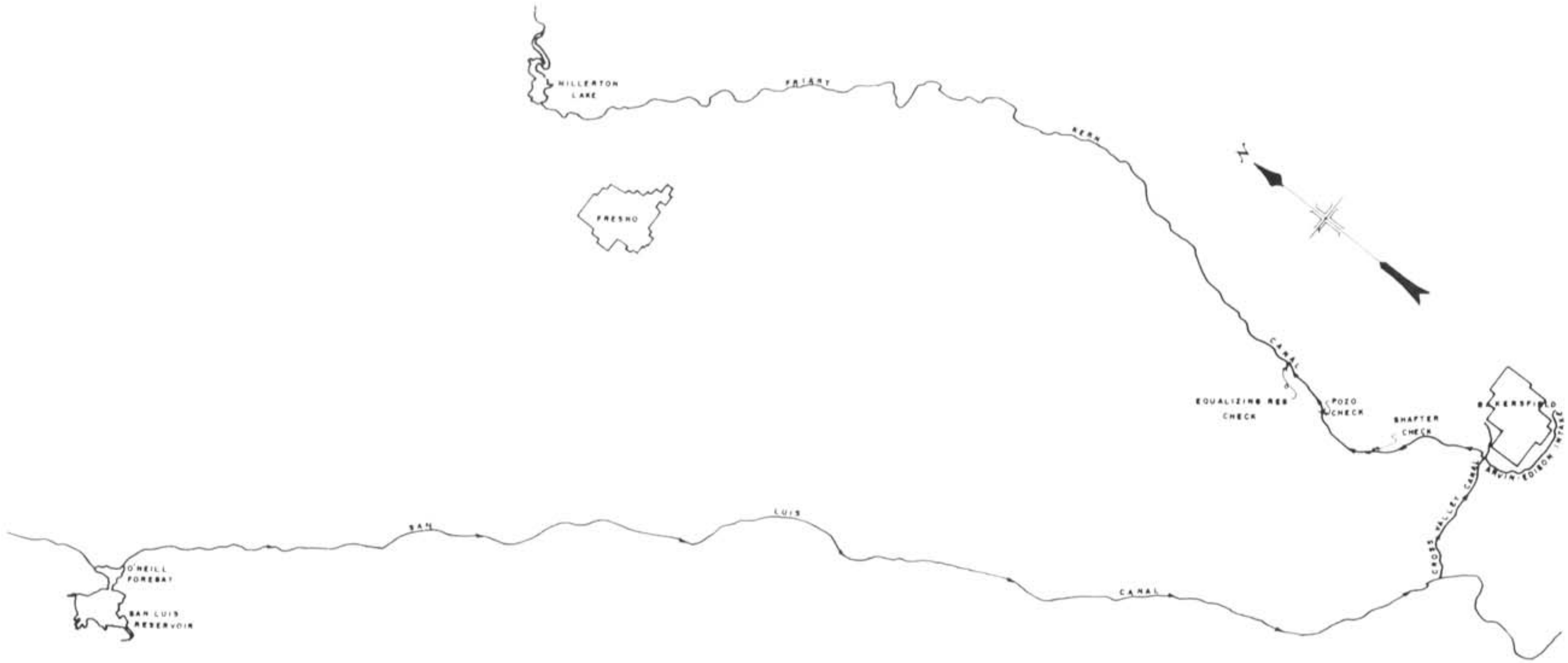


Figure 1. - Schematic of route followed by "waterbank" water.

Figure 2. - View looking upstream at pump and platform installed between the gate arms at the Equalizing Reservoir check.

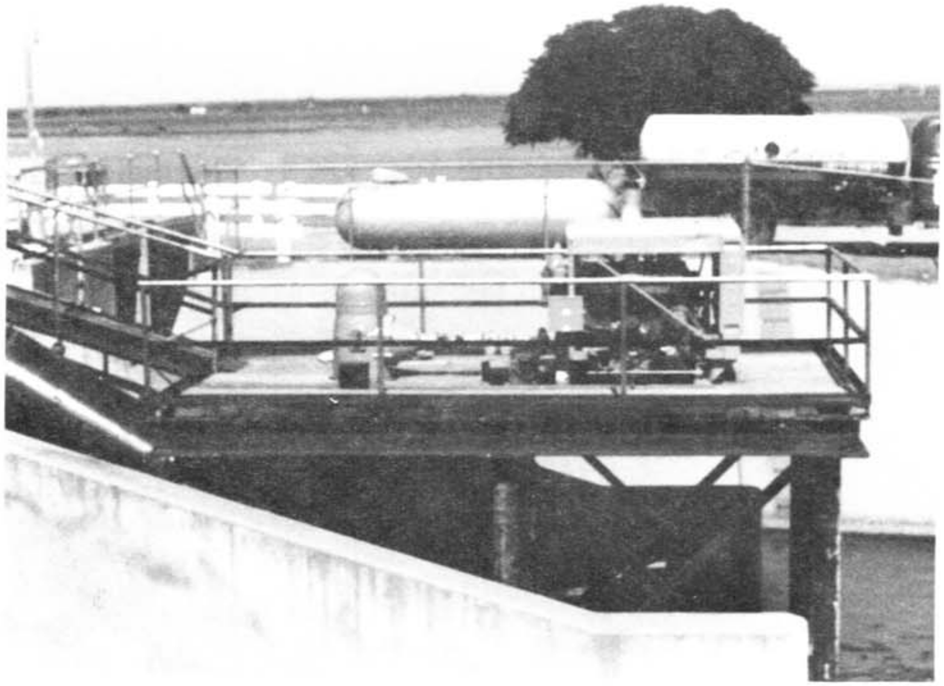

Figure 3. - Side view of pump and platform installed at the Equalizing Reservoir check.

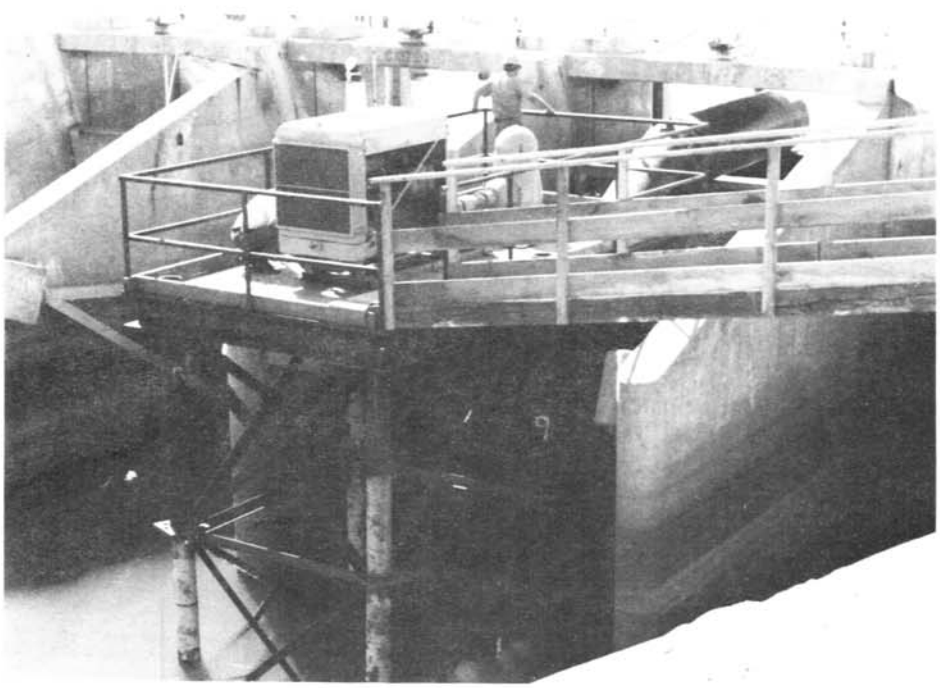

Figure 4. - View showing pump, platform, and discharge pipe installation at Shafter check.

# ELECTRICAL SAFETY - IRRIGATION SYSTEMS[1]

by LaVerne Stetson and Wayne Sides[2]

## Introduction

Electrical safety is often overlooked in acquisition of irrigation systems. In selecting an irrigation system, irrigators will make numerous inquiries about various equipment such as center pivots, pumps, motors, engines, and piping alternatives. Rarely is electrical safety a significant factor in final selection and is taken for granted in the installation.

Failure to inquire about electrical safety should not be attributed to the irrigator alone. Many articles have been written about other safety aspects of shielding moving parts, dangers of overhead powerlines, and injection of chemicals. Few articles have been written about electrical safety of irrigation equipment because very few electrical accidents have occurred. Most electrical accidents with irrigation equipment involve overhead powerlines when a pipe, a drill rig, or some equipment contacts the overhead lines.

However, the potential for electrical accidents not involving overhead powerlines has greatly increased in recent years. Each year has seen many new irrigation installations. More accessories such as fertilizer injectors, compressors, oil pumps, center pivots, and automation equipment to improve irrigation efficiencies are now added, increasing the probability for component failure. Electrical training of new installers needed to keep up with the irrigation growth has not been adequate in many instances.

Money availability is another factor which contributes to not having all of the necessary electrical safety equipment. Loans obtained for irrigation improvement may not include costs for all of the electrical installations and out-of-pocket expenses are saved when necessary equipment, suggested by the electrician, are excluded.

During the past two irrigation seasons, there have been at least five electrocutions associated with irrigation equipment and not involving

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[1] Reprinted by special permission of Mr. LaVerne Stetson. Paper presented at the 1977 Nebraska Irrigation Short Course, Lincoln, Nebraska, January 24-25, 1977.

[2] Agricultural Engineer, Agricultural Research Service, U.S. Department of Agriculture, Lincoln, Nebraska; and Member Services Supervisor, Midwest Electric Membership Corporation, Grant, Nebraska, respectively.

overhead powerlines. Two of these deaths could have been prevented if the electrical equipment had been properly installed and grounded. One of the first requirements of a safe installation is proper grounding.

## Proper Grounding

An evaluation of the grounding procedures on irrigation systems was conducted as a result of the first electrocution in 1975. This evaluation revealed that a lethal hazard could exist on irrigation systems that were not supplied with a grounding conductor from the electrical source. Grounding electrodes (ground rods) alone or connecting to metal well casing on irrigation equipment do not provide adequate electrical protection. The ground rods must be installed; however, they must also be metallically connected (bonded) and connected to the ground at the source of electrical supply. An evaluation of an electrocution in 1976 revealed that the grounds were not bonded, so a fault to one ground did not blow the fuses.

Many irrigation pump motors and other irrigation equipment have been installed in past years without a grounding conductor. These older systems are served by a three-wire service. All new irrigation installations must be provided with a four-wire service as required by section 250-61(b) of the National Electrical Code. Some rural power suppliers and some irrigation equipment dealers (particularly center pivot dealers) have programs retrofit older installations to provide the fourth (grounding) conductor.

A circuit diagram of an improper three-wire installation is shown in figure 5. Note that grounding electrodes (ground rods) at the pivot and the pump motor are not bonded to the service ground.

A properly grounded circuit for an electrical irrigation installation is shown in figure 6. Note that all metal enclosures, equipment, and ground rods are connected by a grounding conductor. In case of an electrical failure, the grounding conductor is intended as a low-resistance return path through which current can flow. Low-resistance results in large current flow and should cause a fuse to blow or circuit breaker to trip and eliminate any lethal voltages. The grounding conductor should carry current only under fault conditions and not during normal operations.

The electrical diagram shown in figure 6 is taken from a recently developed and adopted electrical standard for irrigation. This standard entitled "Standard for Electrical Service and Equipment for Irrigation," has been approved by the Nebraska Inter-Industry Electrical Council, the Irrigation Association (formerly the Sprinkler Irrigation

Association), the Nebraska Chapter of the Western Section of the International Association of Electrical Inspectors, the Nebraska Rural Electric Association, and the Agricultural Research Service of the U.S. Department of Agriculture.

The standard was developed to provide a common document for irrigation electrical equipment and electrical service. A previous irrigation standard of the Nebraska Inter-Industry Electrical Council was revised and several new sections and circuit diagrams added for this new standard. The standard is intended for use by power suppliers, well drillers, irrigation equipment dealers, electricians, and irrigators.

In addition to containing several wiring diagrams for proper service and grounding, the standard contains sections on pump panels, pump motors, equipment sizing and protection, power factor correction, lightning arrestors, irrigation machines, interlocking, and miscellaneous requirements.

Copies of the standard may be obtained by contacting the authors or the Agricultural Engineering Extension, UN-L, Lincoln, NE 68583.

## Electrical Inspections

### Rural Electrical Inspection

Wayne Sides, the Member Services Supervisor of the Midwest Electric Membership Corporation, conducted electrical tests and inspection of the irrigation service to 410 installations during August and September 1976. All of these installations had electric pump motors and center pivot machines. Of these 410 systems, 345 had electric-drive center pivots. Of the 345, 129 did not have a grounding conductor to the pivot. This lack of a grounding conductor means that 37 percent of the systems checked were potentially hazardous. Similar percentages of ungrounded pivots can be found in other rural electric systems. In 181 of the 345 installations, the service to the center pivot did not have a fuse or a means for disconnection. The inspection also revealed that 133 of the systems did not have a ground rod installed. Numerous other defects were found in the inspection. Among those found were loose connections, improper heater sizes, deteriorated insulation, and many others which could cause electric shock or equipment failure. Each irrigator was notified by letter of all electrical problems noted in the inspection process. The tests by Mr. Sides also revealed that some motors were severely overloaded by as much as 30 percent. The average overload for 102 motors rated at 74 600 W (100 hp) was 9 percent.

## State Inspection

Official inspections have also been made by Larry Smith, an electrical inspector of the State Electrical Board. These official inspections were made as a result of owners' requests and fee payment to the State Electrical Board. The requests were prompted by a letter from a center pivot manufacturer to its customers indicating an inspection was needed to insure electrical safety. The inspection included examinations and tests, when needed, of all electrical equipment from the service transformers to the main panel of the center pivot. Each system was expected to meet minimum requirements of the National Electrical Code.

Of the 77 systems inspected from September to December, 10 were classified as lethal, 38 were classified definitely hazardous, and the remaining 29 were classified potentially hazardous. Each system considered lethal had current flowing to ground at the time of the inspection or had resulted in a near electrocution in the recent past. Those systems classified as definitely hazardous had two or more major violations of the National Electrical Code. Since all systems inspected were classified potentially hazardous or worse, none was approved. A summary of code violations was provided to each owner.

Unsafe electrical installations on irrigation equipment are not unique to Nebraska. Checks of irrigation systems in other states have revealed the same problems which have been found by inspections in Nebraska.

## Action Required

Recent electrocutions and several severe shocks, along with failure of many irrigation electrical systems to pass even a casual inspection, indicates that some immediate action is needed to prevent deaths in 1978.

Irrigators should have their electrical systems checked by an electrical inspector or someone who has equivalent qualifications. Proper equipment must be installed by approved methods and with good workmanship.

It is obvious that additional training is needed for installers of irrigation electrical equipment. They need to be informed of the current equipment, methods, and techniques required for electrical irrigation equipment. In particular, all electrical irrigation equipment must be adequately protected and properly grounded.

Several center pivot manufacturers now have training programs for their installers and servicemen, however, this training does not often cover training for the electrical installations of the pump motor, the fertilizer injector motor, or the service to the center pivot (if one is used). Training of electrical installers for irrigation equipment may best be done by a joint effort of the State Electrical Board, Rural Electric Systems, and the Agricultural Extension Service.

No matter what approaches are taken, it is obvious that major action is needed to improve the electrical safety of irrigation equipment before the 1978 irrigation season.

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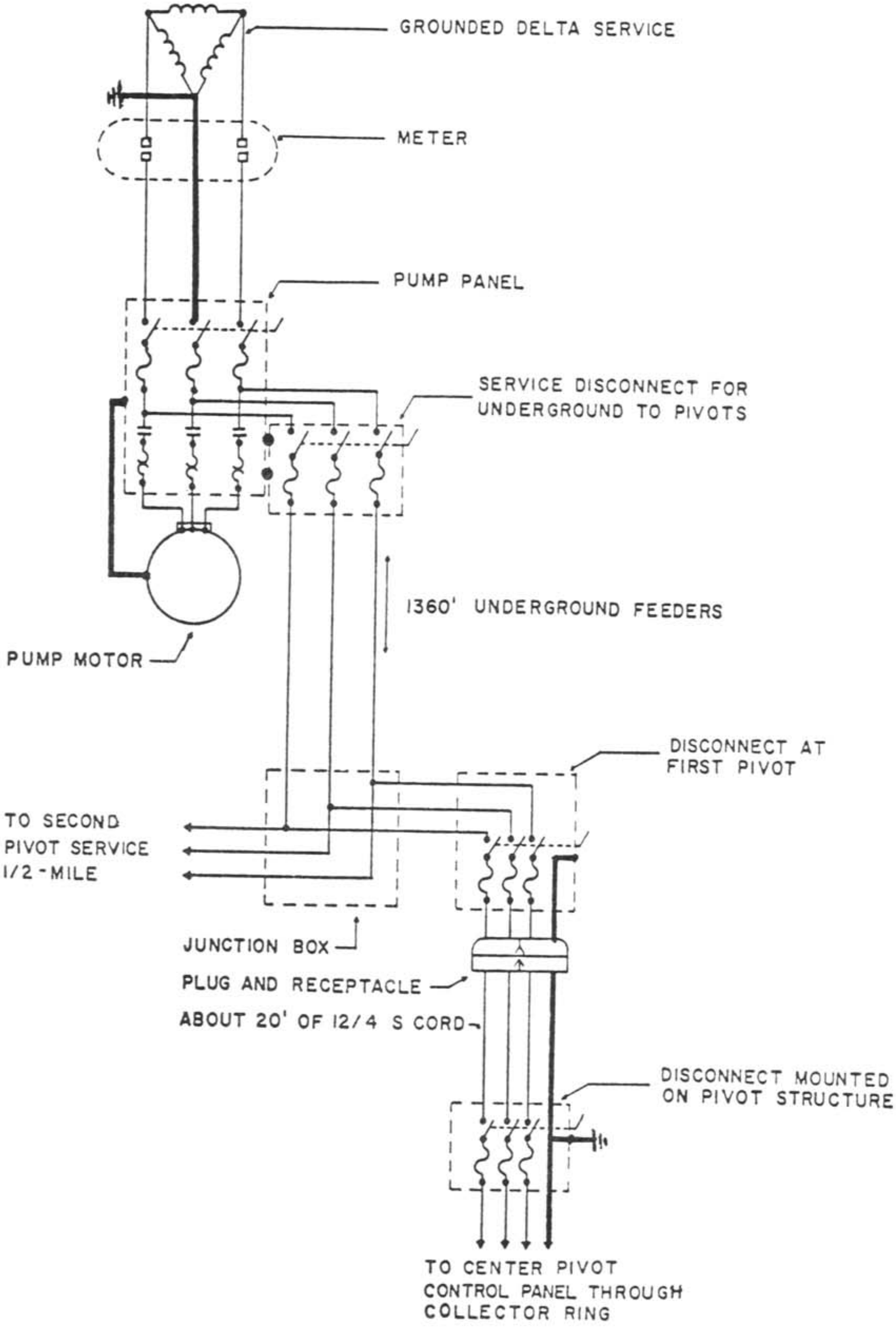


Figure 5. - Improperly grounded irrigation system. Note that grounds at the pivot and pump motor are not bonded to the service ground.

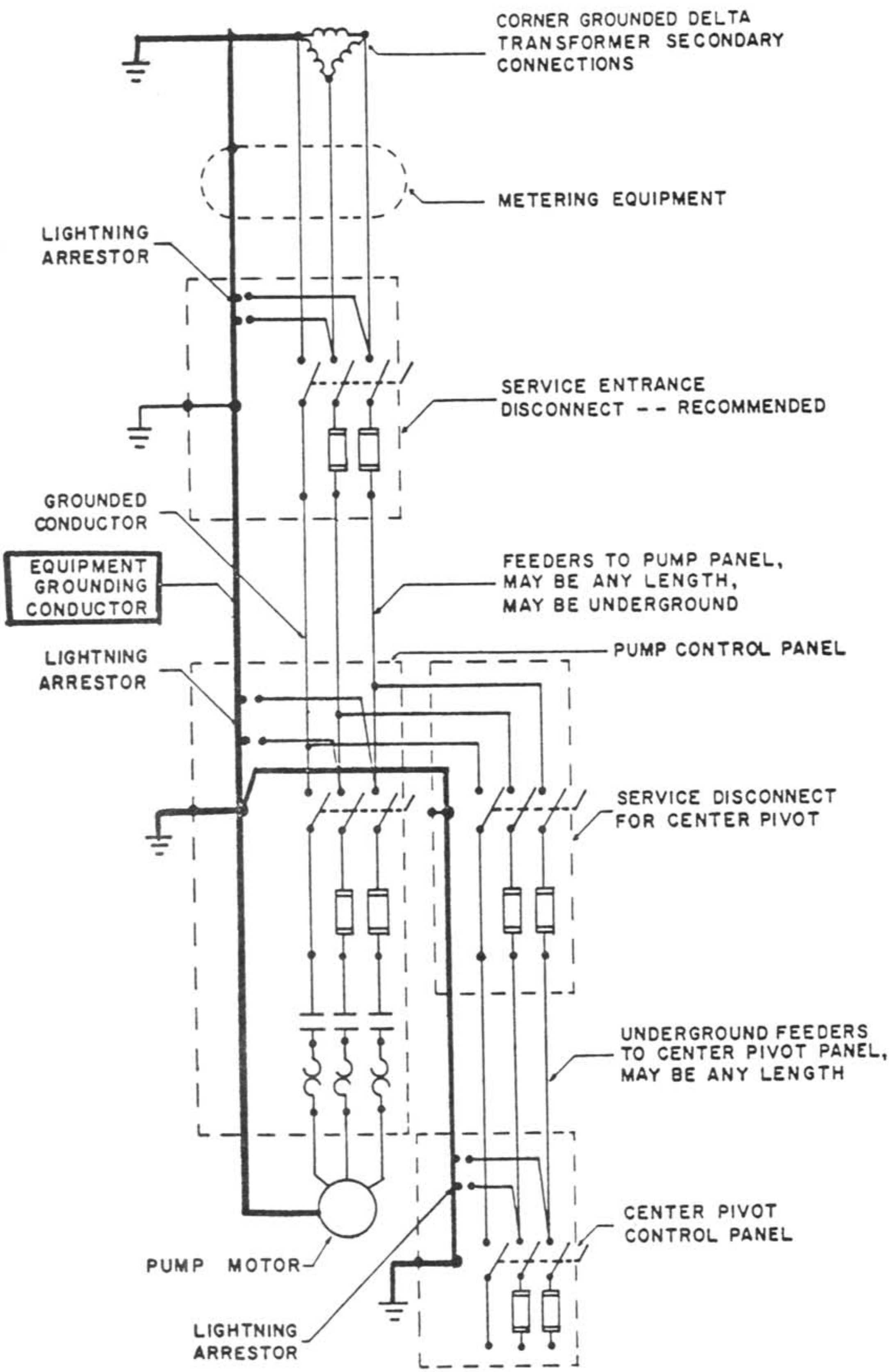


Figure 6. - Properly grounded irrigation system. Note that all metal enclosures, equipment, and grounds are connected by a grounding conductor.

# A WAY TO SERVICE STEEL, ROLL-UP DOORS AT HALF THE COST[1]

Nearly all of the buildings at our various facilities have steel, roll-up doors installed somewhere. Whether pumping plants, powerplants, or maintenance buildings, they have from one to several of these handy doors. In the Oroville Field Division, there is a program of periodic maintenance for such doors. This work included replacing the gasket-like strips of rubber which sealed the edges of the doors to prevent cold winds and rattles. The strips were replaced more often if they sustained unusual wear or deterioration. The general arrangement is a rather wide strip, say 127 mm (5 in) along the bottom, and somewhat narrower strips down each side. These insulating "gaskets," when obtained from a dealer, cost about $3 for 0.3 meter (1 foot) for the wide type, and $2 for 0.3 meter (1 foot) for the narrow. If an average door was 1.35 $m^2$ (15 $ft^2$), that represented a tidy bit of money.

Leo Lantsberger, faced with another round of replacements, thought he might have an alternate source of supply for the costly rubber strips. Leo was sure that he could get similar strips of rubber locally for less money. With authorization, he contacted a Sacramento supplier who could provide the strips of right width, but of random lengths. The cost would be less than half of the old, contractor-supplied items. Random lengths meant that they would have to be joined together in some way, at least some of them, in order to get strips of the size required. No problem! Leo was sure he could bond the strips with one of the new "wonder" glues available.

To assure that the bonding would work as well as possible, Leo made a cutting board where he could position the rubber strips and control the angle of the cut each time. A square fits flush against the edge of the board and securely across the strip. The cuts are made on an angle of 45 degrees so that the joints will butt together closely. The glue used is the kind which sets up fastest.

For additional information, please telephone or write to D. B. Trotter, General Maintenance Superintendent (916-534-2354), or Bill Hansel, Maintenance Supervisor (916-534-2347), Oroville Field Division, California Department of Water Recources, Post Office Box 939, Oroville, CA 95965.

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[1] Reprinted by special permission of Editor, from Technical Bulletin No. 33, dated 1977, California Department of Water Resources.

## BENTONITE SEALS PONDS AND DITCHES[1]

A natural substance found abundantly in the Rocky Mountain area and used in industries ranging from oil drilling to paper making can help farmers conserve substantial amounts of agricultural water.

The element is bentonite. According to a Colorado State University research engineer, the versatile substance is an inexpensive, easy-to-install sealing material for ponds and irrigation ditches. Bentonite seals by swelling and/or plugging when it gets wet.

Dr. Morris Skinner explained that seepage loss from irrigation ditches, canals, and reservoirs is a serious problem in the state. The loss is in excess of $2\,467 \times 10^6 m^3$ (2 million acre-feet) of water annually, he said. The $2\,467 \times 10^6 m^3$ (2 million acre-feet) would cover the entire state of Colorado with water 8.5 mm (1/3 of an inch) deep.

Relatively few seepage control measures, such as lining, are being done, especially in mountainous areas. The major reason is that the most commonly used lining material is concrete. But concrete is expensive.

"Yet, we need a comprehensive program of canal and pond lining in most irrigated areas of Colorado," Skinner said. "For a number of reasons, we think bentonite is the most practical engineering material to use."

Skinner pointed out, for instance, that bentonite can be installed in canals simply by mixing in the material with water at a headgate and allowing the bentonite to settle itself through a canal.

Another advantage of bentonite is that it won't harm fish or plant life; also a bentonite treatment ought to last about 5 years. A farmer, therefore, may get back his financial investment within 1 year by the water that is saved.

In some cases, Federal money is available to farmers to defray costs of sealing ditches or ponds with bentonite.

Skinner further pointed out that use of bentonite isn't limited to agricultural water supplies; it also could be used in various situations to help prevent water losses.

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[1] Reprinted by special permission of the Editor, from a recent issue of Colorado Rancher and Farmer.

Perhaps the greatest advantage of bentonite is that it is inexpensive. Its cost is about $12 to $15 a ton for Colorado bentonite and about $20 a ton for high-swelling Wyoming bentonite. Many farmers, however, may have bentonite on their properties, Skinner said.

Bentonite, a clay-like material, comes in many colors, although red, green, yellow, and white are most common. When wet, the material has a "waxy feel," Skinner said. Dry bentonite in the field has a light color and "a popcorn texture." Very little vegetation will grow around a bentonite deposit.

Skinner advised that farmers who believe they have bentonite on their properties may want to take a sample to a commercial laboratory for analysis.

In-depth information about bentonite is now available in a CSU publication. The publication, "Evaluation of Colorado Clays for Sealing Purposes," is Technical Bulletin No. 83 and is published by the CSU Experiment Station.

The $1 publication describes such things as the uses of bentonite, various methods of installation, and favorable locations of clays in Colorado.

Information about bentonite and testing, development, or installation of the material can be obtained from Skinner in the Department of Civil Engineering or at the Engineering Research Center at CSU.

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## A SAFETY LADDER FOR CLIMBING ONTO UNITS AT BUENA VISTA[1]

At the Buena Vista Pumping Plant, the problem of access onto the housing of the main units is compounded by the fact that it is necessary to climb over the air coolers that are attached to the outside of the housing. The air coolers extend out quite a distance. An ordinary ladder would not do it. Coolers are at different heights and the ladder angle would be too severe. This would be clumsy and even dangerous. A custom-made ladder seemed the obvious answer, but the prices quoted were too much to consider. Safety more-or-less demanded some improved ladder so the crew at the pumping plant tailored one to fit.

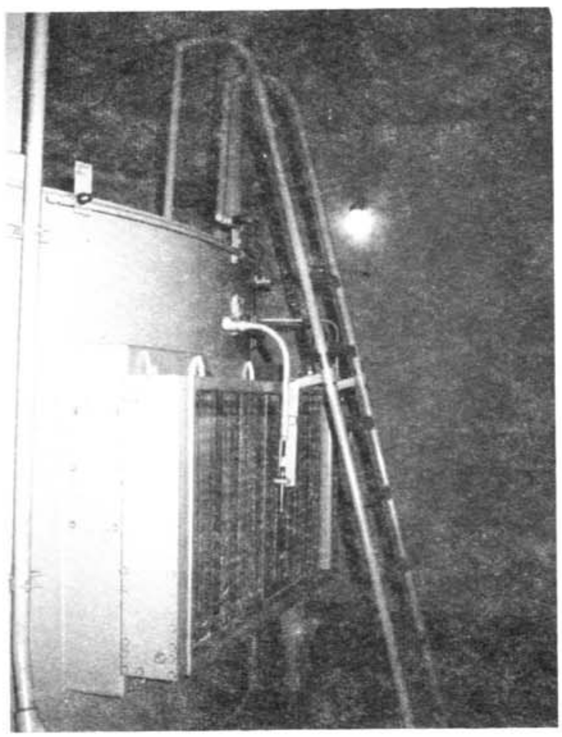

Figure 7

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[1] Reprinted by special permission of Editor, from Technical Bulletin No. 33, dated 1977, California Department of Water Resources.

Description

The material selected was 38-mm (1-1/2-in) steel conduit, both for the ladder rails and rungs. Approximately 3.7 m (12 ft) overall, the ladder curves to reach over the air coolers at a safe angle (fig. 7). The rungs are spaced 300 mm (12 in) apart, as for a regular ladder; the custom-made model is also a standard 457 mm (18 in) wide. The legs have nonslip feet (fig. 8). These were made from large size washers with "ears" welded to them for the bolts. They are fitted with rubber disks to prevent any accidental slip. As further precaution against any change movement, a locking device slides down the ladder rails and clamps over the edge of the unit air cooler. This lock is adjustable to accommodate the varying heights of the coolers. The ladders work just fine.

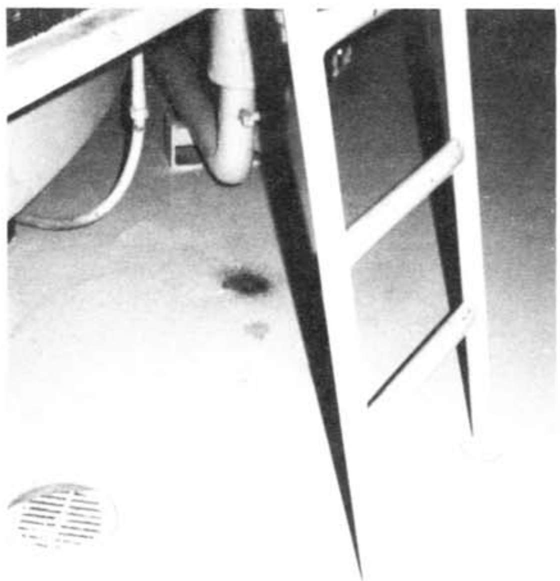

Figure 8

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## SOME SPRAYS CAN DAMAGE POLYCARBONATE HATS[1]

Spraying a hard hat with insect repellent would seem to be a helpful solution to the mosquito problem for outdoor workers, but a recent incident reported by B. C. Forest Products, Limited, has brought home this important fact: Chemicals sprayed on hard hats cause a reaction that weakens the shell of the safety hat.

Recently they arranged for tests on two hard hats, which, after being dropped from a height of just 1.2 m (4 ft), were cracked from brim to brim. The hats had been sprayed with a chemical solvent, and the subsequent report from the Safety Supply Company explained the chemical reaction this way:

> "The hard hat shell was made of polycarbonate - one of the strongest thermoplastics available for use in the manufacture of head protection. This material, however, can be affected by solvents and hydrocarbons. In the plastics industry, the effect is called crazing. A polycarbonate material even wiped with a solvent and left on a shell for 6 months would eventually crack. The solvent causes the polycarbonate to become so brittle that the least shock will cause it to split. The particular hat examined had been sprayed inside and outside, and the conclusion was that an insect repellent could have done the damage. Most insect repellents as a spray have a solvent base; another revealing clue was the loss of the hat's high-gloss finish, clear evidence of solvent on polycarbonate."

B. C. Forest Products consequently instructed its employees to refrain from using insect repellents, spray paint, or solvent on hard hats.

The Industrial Hygiene Department of the Workman's Compensation Board of Ontario backs up this warning for all hard hat users with this list of materials that could reduce the strength of plastic-type hard hats:

1. Pesticides and other solvent-containing sprays

2. Solvents from glues on labels and other attachments

3. Solvents and oils in cleaning and polishing compounds which might be used to clean and shine some workers' shoes

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[1] Reprinted by special permission of the Manager, News and Public Affairs, Industrial Accident Prevention Association, Ontario.

4. Solvents and oils to which the hats may be exposed in the work tasks, or careless storage
5. Extremes of temperature and sharp changes of temperature that might be encountered by refrigeration workers
6. Over-exposure to sun, heat, and cold through poor storage conditions
7. Over-exposure to phenolic sterilization solutions
8. Solvents and oils from paints, lacquers, and varnishes - spray-on or brush-on
9. Exposure to strong chemicals such as strong acids, alkalis, oxidizing agents
10. Mechanical abrasion damage of all sorts.

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## TAKE ADVANTAGE OF A DEATH DETERRENT[1]

The seat belt is the most effective deterrent to death or serious injury in an automobile accident, according to the National Highway Traffic Safety Administration (NHTSA). It is estimated that using a lap belt reduces the chance of fatality by 40 percent and using a lap-shoulder belt, by 60 percent. Unfortunately, only about 22 percent of drivers and passengers bother to buckle up.

These statistics suggest that it is worth your while to secure your seat belt before driving off on a summer trip. It is also just as important to buckle up for a drive to school or the supermarket; NHTSA data reveal that more than half of all automobile accidents involving injury or death happen at speeds under 64 km/h (40 mi/h) and about three out of four fatalities occur within 40 km (25 mi) of the mortorists' homes.

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[1] Reprinted from Reclamation Safety News, Second Quarter 1977.

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## TIRE SAFETY[1]

Underinflating your tires, especially in high speed, hot weather driving, can cause heat buildup and blowouts. People who insist on a soft ride by underinflating tires affect the performances of the braking system, steering system, and the transmission of power from motor to road. This practice also weakens the tire rapidly to the point where it fails. Proper inflation is the key factor in the satisfactory performance of a tire.

State troopers insist on 2.7 to 3.6 kg (6 to 8 pounds) more than normal air pressure in their tires to afford better steering and control. Stock car drivers use 27 to 32 kg (60 to 70 pounds) of air in tires which take the greatest punishment on curves. If a tire is overloaded by 20 percent at 11 kg (24 pounds) pressure, inflating it to 14 kg (32 pounds) will cut the heat buildup virtually in half.

Avoid tire destruction by inflating according to your car manual; this is usually 1.8 to 2.7 kg (4 to 6 pounds) above normal pressure for high speed driving or heavy loads. Tires are built to contain up to 113 kg (250 pounds) pressure; therefore, overinflating will not cause a blowout.

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[1] Reprinted from National Safety Council Safety Newsletter, August 1976.



GPO 844-993


The purpose of this Bulletin is to serve as a medium of exchanging operation and maintenance information. Its success depends upon your help in obtaining and submitting new and useful O&M ideas.

Advertise your district's or project's resourcefulness by having an article published in the bulletin! So let us hear from you soon.

Prospective material should be submitted through your Bureau of Reclamation Regional office.