WATER OPERATION AND MAINTENANCE

BULLETIN NO. 79

MARCH 1972

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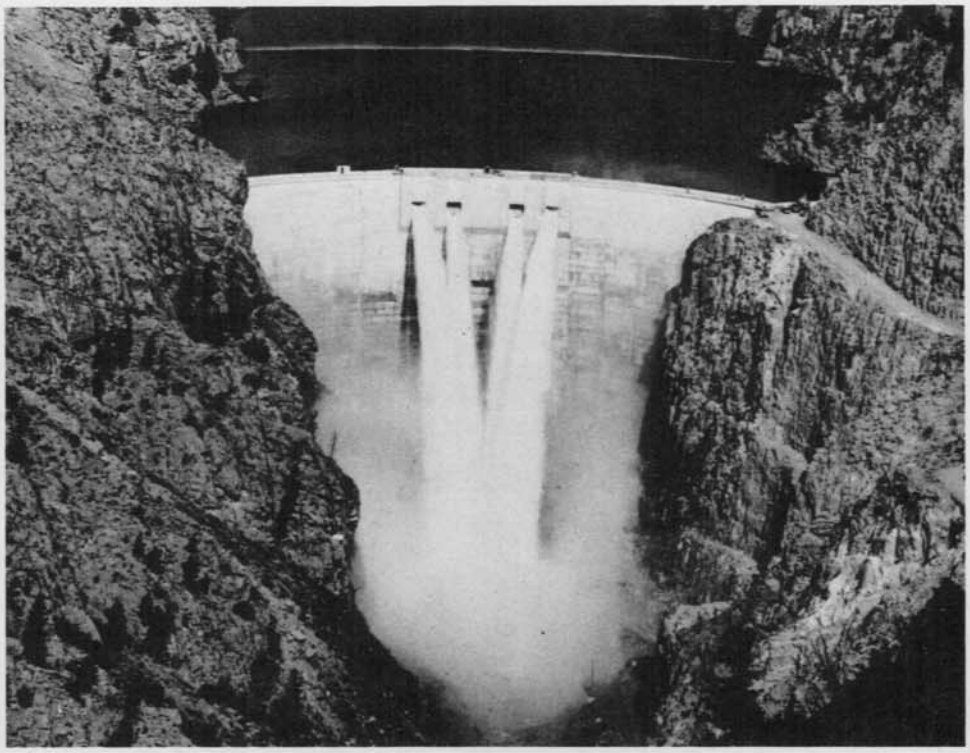

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UNITED STATES DEPARTMENT OF THE INTERIOR

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 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.

* * * * *

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

COVER PHOTOGRAPH:

Morrow Point Dam, Colorado, is the first large double-curvature, thin-arch concrete dam to be built in the United States. The dam is 469 feet high, 740 feet long, 52 feet wide at the base, 12 feet wide at the crest. It has a unique free-fall spillway, with four 15-foot-square openings in the crest of the dam, and a stilling basin at the toe of the dam.
Photo P622B-427-9454

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

BUREAU OF RECLAMATION
Ellis L. Armstrong
Commissioner

WATER OPERATION AND MAINTENANCE
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INTRODUCTION

"New Roofing Systems" is an article on the investigations and development of an improved roofing system for Bureau buildings beginning on page 1.

Headlight glare and what to do to compensate for it is the topic of a short safety article at the bottom of page 4.

The "mud pump" described in the article on page 5, was designed and used by the Corning Water District, for removal of silt from pump sumps and may have application for similar problems in other irrigation districts.

On page 7, attention is called to a Bureau publication entitled, "Reducing Hazards to People and Animals on Reclamation Canals." The rapid growth of a highly mobile population, particularly in areas adjacent to Reclamation canals, is increasing, and therefore prompting the need for additional protective measures.

An adjustable limit switch device used to control the travel of radial or vertical check gates on the Corning Canal is shown on page 9. The idea was submitted by an employee of the Red Bluff Operation and Maintenance Section, Central Valley Project, California.

"Automatic Gate Control--Anti-Hunt Device," is the title of an article on page 12. The modification of this device by the Willows Operation and Maintenance Division, along with the improved probe equipment was responsible for the Corning Canal Check gates being completely automated from the downstream (one reach) station.

A most successful "Loss Prevention" program and the program results reported by the A & B Irrigation District, Rupert, Idaho, is found in an article starting on page 14.

NEW ROOFING SYSTEMS 1/

Developmental Investigations

Problems with asphalt or tar built-up roofs both during construction and in service led to efforts to develop an improved roofing system. The first step taken to modify specifications was to substitute a single ply of neoprene rubber sheeting for the built-up plies of asphalt or tar and roofing felt. The gravel cover was also eliminated and in its place on all but a few roofs a white reflective coat of liquid chlorosulfonated polyethylene was applied in two coats to the rubber sheeting. This was done to provide improved weathering resistance and to reduce the high surface temperatures that would occur with the black colored rubber.

Later, a rubber roofing modification was made by substituting butyl rubber sheeting for the neoprene sheeting. Butyl rubber generally is more economical, more weather resistant and available in larger sized sheets than neoprene rubber. Also at about this time the use of nonabsorbent styrofoam insulation boards was adopted for concrete decks, replacing the formerly used fiber board insulation which would readily absorb water.

The latest development in roofing is an entirely new system. Self bonding, nonabsorbent urethane foam insulation is spray applied directly to the roof deck. A weather coat of liquid applied silicone rubber is then applied to this seamless foam insulation.

Most of the newer roofing systems are providing satisfactory service, however, experience has shown that annual inspections should be made to insure trouble free performance. During inspection some of the points to be considered are discussed in the succeeding paragraphs. The discussion is not intended to cover all problems that can occur with various roofing systems, but to give general guidance for inspection and repair of more commonly encountered problems. If additional information is desired write to the U.S. Bureau of Reclamation, Code 1521, Denver Federal Center, Denver, Colorado 80225.

Reflective Coating

Some neoprene rubber roofs were installed without a reflective coating. On others, only one coat was specified. Where two coats were used the anticipated life span of the coating is expected to be

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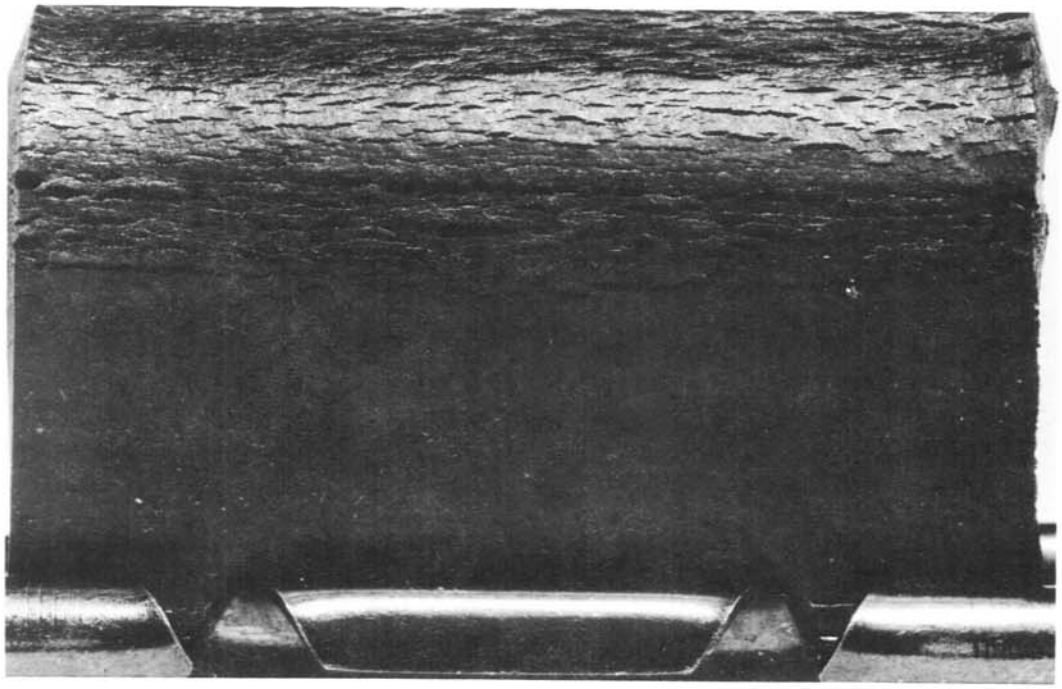
1/ Article was written especially for the Bulletin by Bernard Jones, Materials Engineer, Division of General Research, Applied Sciences Branch, E&R Center, Denver, Colorado.

between 7 and 15 years depending on climate, kind of rubber and kind of liquid chlorosulfonated polyethylene coating.

Where there is no coating, or where coating has weathered and is exposing the black rubber surface, plans should be made to apply sufficient liquid chlorosulfonated polyethylene to obtain a minimum of 8 mils dry film thickness. Usually two gallons per 100 square-feet will provide this thickness. The material should be applied in two separate coats having different colors to insure uniform coating thickness. The rubber surface or old coating should be prepared by removing any loose material and scrubbing with a stiff broom and a detergent solution. The surface should then be rinsed and allowed to dry before applying the coating.

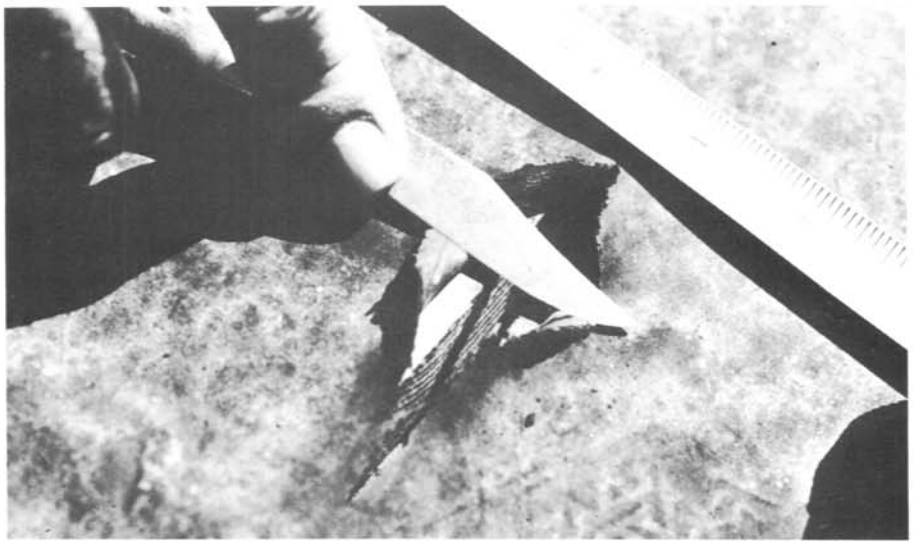
Splits or Cracking

Areas where rubber sheeting has been bent around corners or stretched over cracks should be carefully inspected for the type of cracking shown in Photograph 1, below. This type of surface cracking can lead to early failure, and induce tearing. This is the usual result when the rubber is under stress and it is more severe when high amounts of ozone are found in the air.



Photograph 1 (PX-D-68890)

Splits in the rubber such as shown in Photograph 2 may result from surface cracking or it may be caused by mechanical damage. In this case the rubber was stretched over roof board joint and when shrinking occurred it split the rubber. In either case the affected area should be cleaned as outlined in the above paragraph and a rubber patch of material the same as the rubber roof sheeting should be bonded in place using the sheet manufacturer's recommended adhesive. Cut the patch to allow at least 4-inch overlap away from the affected area. The repaired part should then be coated as outlined above.



Photograph 2 (PX-D-70942)

Stretched Areas

At areas where two surfaces are at right angles the rubber sheeting may have become taut due to shrinkage, forming a drum like condition. Moderate situations of this sort can be tolerated. If it appears that puncturing or tearing could occur, preventive measures should be taken. The rubber should be cut with a knife for a sufficient length to allow complete relaxation of the sheet. A rubber patch 4 inches longer and wider than the resulting hole should then be applied. Surface preparation, patching and reflective coating procedures should be followed as outlined.

Seams

Seams which have started to open should be calked with a rubber sealant recommended by the sheet manufacturer. If a "fish mouth" condition exists in the seam a V notch should be cut in the sheet sufficient in size to allow the sheet to relax. Surface preparation, patching and coating should then be accomplished as mentioned above.

Sprayed-in-place Urethane Foam Coated with Silicone Rubber

This material may develop holes or tears in the coating if subject to physical abuse or unusually heavy hail storms. No attempt should be made to disturb the coating or foam. Such splits may be easily repaired by sealing the split with silicone sealant materials commonly found in hardware stores, department stores, or lumber yards. Colors are generally limited to clear or white but quantities needed are usually small enough that color difference from the coating will not be noticeable from a distance.

* * * * *

HEADLIGHT GLARE

The fact that night highway fatality rates are higher than day rates is largely due to the problem of headlight glare.

Drivers put too much trust in their own headlights. The finest headlights depreciate rapidly--often lose 60 percent of their effectiveness--if they are not kept clean and in perfect focus.

Drivers also forget how the human eye is handicapped. In darkness, the eye pupil expands to admit all light possible. When a brilliant headlight beam strikes that wide-open pupil, it is painfully dazzled and contracts swiftly.

The pupil contracts, however, about sixty times faster than it can expand. When glaring headlights have passed, a curtain of blackness hangs on that leaves one almost blind.

During that blind interval, if you are driving 40 miles an hour, your car will travel about 200 feet.

In the face of glare, many drivers watch the righthand margin of the roadway, but even this limits their range of vision. Two other precautions should be taken:

1. Be sure you have lowered--or dimmed--your own headlights; the other driver will do the same.

2. Whether or not he lowers his headlights, reduce your speed until the effects of the glare have passed.

Reprinted from Hospital Safety Services Newsletter. A publication of the National Safety Council.

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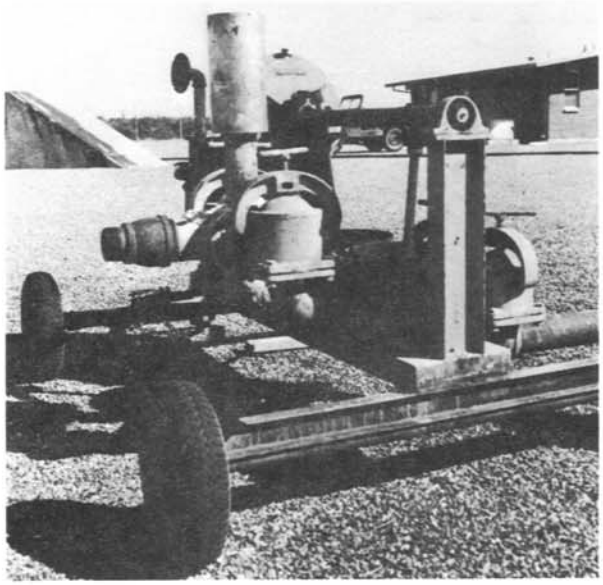
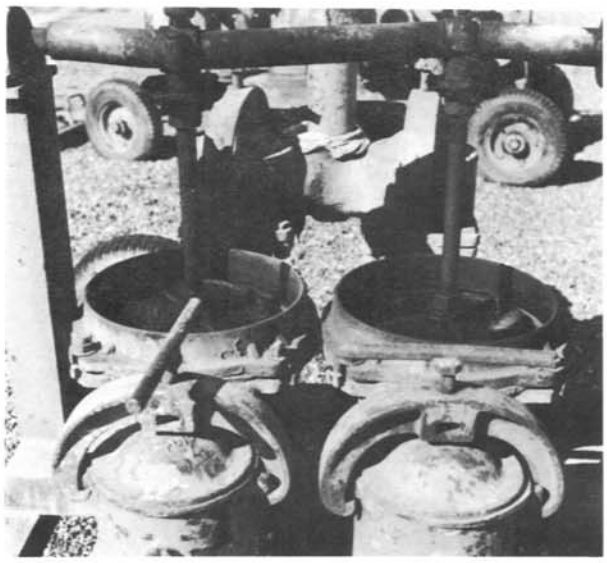
SILT REMOVING MUD PUMP

The "Mud Pump" described in this article was designed and fabricated by personnel of the Corning Water District, Central Valley Project, Corning, California. The small flathead pump is used for removing silt from the pumping plant sumps. An overall view of this unique pump used by the Corning Water District is shown in Photograph 1 at left, and Photograph 2, is a closeup view of the pump.



Photograph 1 (P602-D-70941)



Photograph 2 (P602-D-70940)

In some cases a small amount of water has been added to make the silt more fluid before pumping. It was also reported that water and silt was removed to within 2 inches of the sump floor with the use of the special suction nozzle shown in Photograph 3 on the next page. The silt was pumped from sump pits having as much as an 18 foot lift. An end view of the suction nozzle is shown in Photograph 4 at bottom of next page. Please note the 1-1/2-inch cleats needed to hold suction off the sump floor.

The 4-inch diaphragm pump as described here is powered by a 15-horsepower motor. If additional information is desired regarding this pump, please write to:

Project Construction Engineer
USBR
Sacramento Valley Construction Office,
Post Office Box 988,
Willows, California 95988.

Photograph 3 (P602-D-70939)

Photograph 4 (P602-D-70938)

REDUCING HAZARDS TO PEOPLE AND ANIMALS ON RECLAMATION CANALS 1/

Despite the fact the Bureau of Reclamation has an excellent public safety program, people and animals are continuing to drown in canals. The conclusions of an investigation conducted by the Bureau can be found in a publication titled as above, dated September 1971. This publication can be purchased from the Bureau of Reclamation, Code 920, Denver Federal Center, Denver, Colorado 80225. Price $1.55. Bureau offices can obtain copies by requisition to the E&R Center at the address shown.

This report contains a detailed survey of drownings of people and a brief review of current safety practices and policies. For a complete study of Bureau safety policy and practices relating to Bureau reservoirs and waterways, the reader is referred to USBR General Design Standards, Chapter 3, Safety Design Standards, and the bulletin entitled Canal Safety. A more detailed review of the problem of animal drownings is presented herein because much of this information has never before been published. This report also includes a discussion of both the costs and some of the benefits of placing canals in buried conduits and of covering and fencing canals. In addition, other safety considerations such as, using stepped or corrugated canal linings, allowing canals and rights-of-way to be used for recreational purposes, constructing canals with flatter side slopes, and attaching cleats to linings of existing canals, have been investigated and are included in the report.

A detailed economic study of the costs and benefits of reducing or eliminating the hazards of open canals was not made because of the many variables involved in this broad study of the problem. Land costs throughout Bureau projects may vary by 1,000 percent, and can even have a wide range within a project. The value of water varies greatly, and operation and maintenance costs differ from project to project. The size and cost of facilities required will depend extensively upon local conditions. For example, the cost of conveying a given quantity of water by pipe will vary in accordance with the topographical characteristics of each Bureau project. Thus, developing typical costs and benefits would result in meaningless comparisons. However, information related to the problem of public safety is presented that will be of assistance to waterway planners, designers and operators.

1/ An Open and Closed Conduit Systems Program publication by H. S. Latham, Division of Safety, Engineering and Research Center, Denver, Colorado and J. M. Verzuh, Division of Design and Construction, Regional Office, Billings, Montana.

The loss of a human life is a tragedy which affects the immediate family of the deceased forever. It is also an economic loss to the nation. Unfortunately, this tragedy occurs approximately 30 times every year on Bureau-constructed canals. In the past 5 years there have been 152 public drownings on these waterways. Even more tragic is the fact that 40 percent of the victims were children. A record of public drownings from January 1, 1971, through September 30, 1971, is shown below:

RECORD OF PUBLIC DROWNINGS

Bureau-operated Facilities:		
Canals		23
Reservoirs		3
	Total	26
Facilities Operated by Others:		
Irrigation and Water Districts		23
State or County (Recreational)		41
	Total	64
Summary of Total Drownings During Period:		
By Operating Agency:		
Bureau of Reclamation		26
Irrigation and Water Districts		23
State or County (Recreational)		41
	Total	90
By Type of Facility:		
Canals		45
Reservoirs		45
	Total	90
By Activity:		
Swimming		30
Boating		9
Fishing		5
Fell into water		26
Other		20
	Total	90
By Age:		
Under 12 years of age		17
From 12 to 25		47
From 25 to 50		16
Over 50 years of age		10
	Total	90

* * * * *

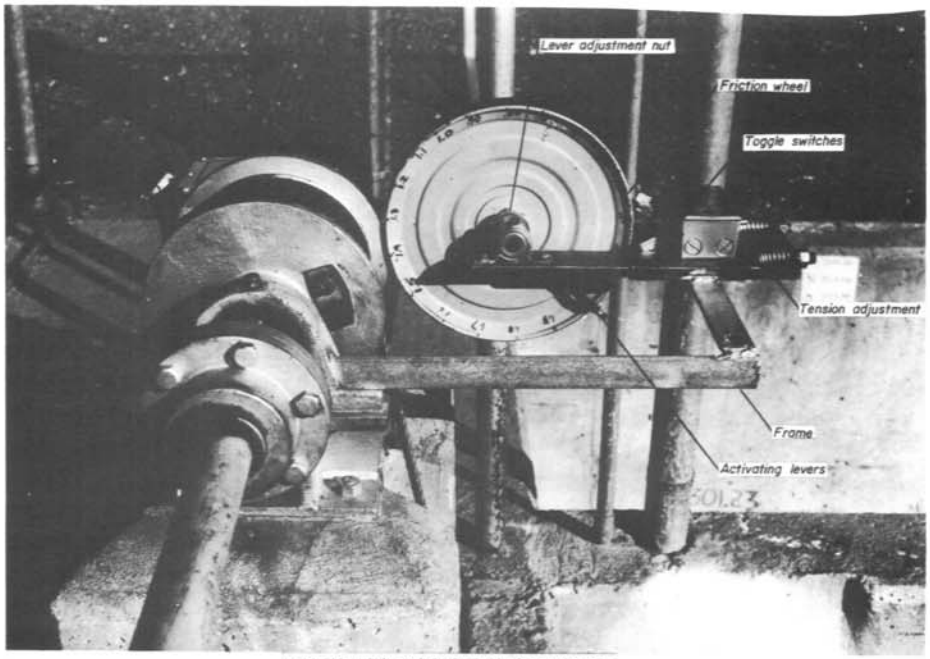
ADJUSTABLE LIMIT SWITCH DEVICE
(Suggestion No. R2-71S-19)

To control the travel of radial or vertical check gates on automatic canal systems the Sacramento Valley Construction Office, Central Valley Project, Willows, California, has installed a unique limit switch device on the Corning Canal. The suggestion was made by Mr. William Haun of the Red Bluff Operation and Maintenance Section and was fabricated by shop personnel. It was reported the device works very well, and is doing the operation it was designed for.

The Corning Canal has been automated for downstream control to maintain canal water elevations, compensating for fluctuations in water levels by transmitting a signal from the downstream end of a pool to a check structure located at the head of the pool, causing the gate to raise or lower.

Prior to the initial testing of the automatic system they were concerned with the possibility that some malfunction of the equipment could cause the canal to overflow, particularly during the night when the canal is unattended. The canal has a capacity of 500 cfs at the head which reduces along its length of 21 miles to 88 cfs. An excessive amount of gate opening upstream could result in flows greater than canal capacity.

Mr. Haun's device regulates the amount of gate opening or closure. The range settings of the adjustable limit switches are preselected by an Irrigation Operator for the volume of flow required to pass through the check structure. The device is shown in Photo 1 below:

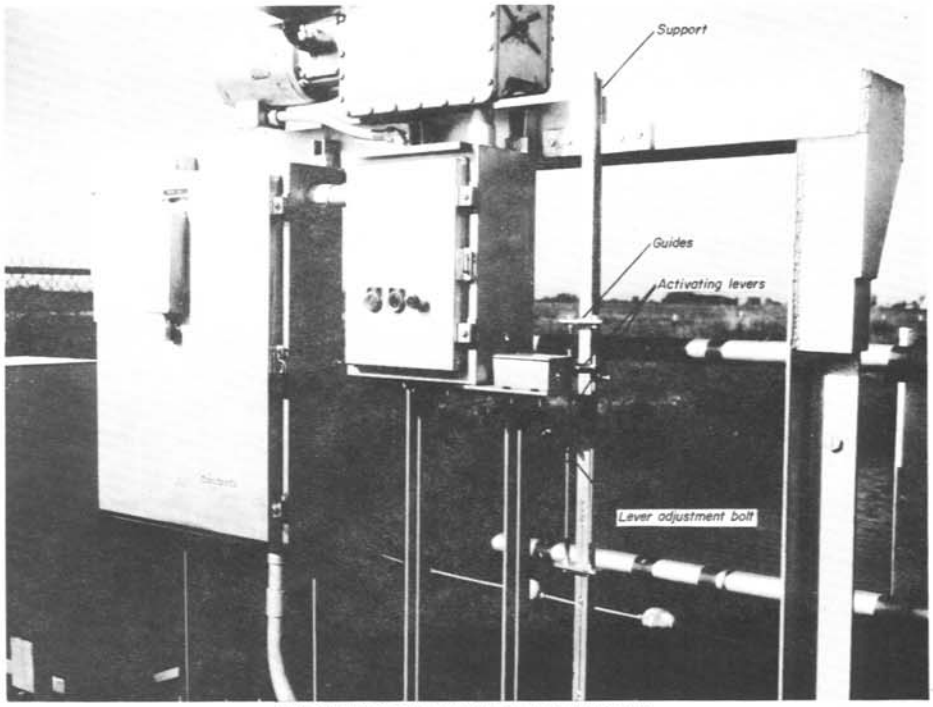


Adjustable Limit Switch Assembly for Radial Gate

Photograph 1 (P602-D-70937)

The idea as presented by Mr. Haun, consists of a calibrated, friction driven wheel, adjustable lever arms, and electrical toggle switches. The wheel is driven by friction with the cable drum on the gate motor shaft, and is integrated to show true gate opening. The switch activating levers are affixed to the wheel with a locking nut which can be loosened off for adjusting; the switches are in the "normally on" position and electrical contact is broken when activated by the lever arms.

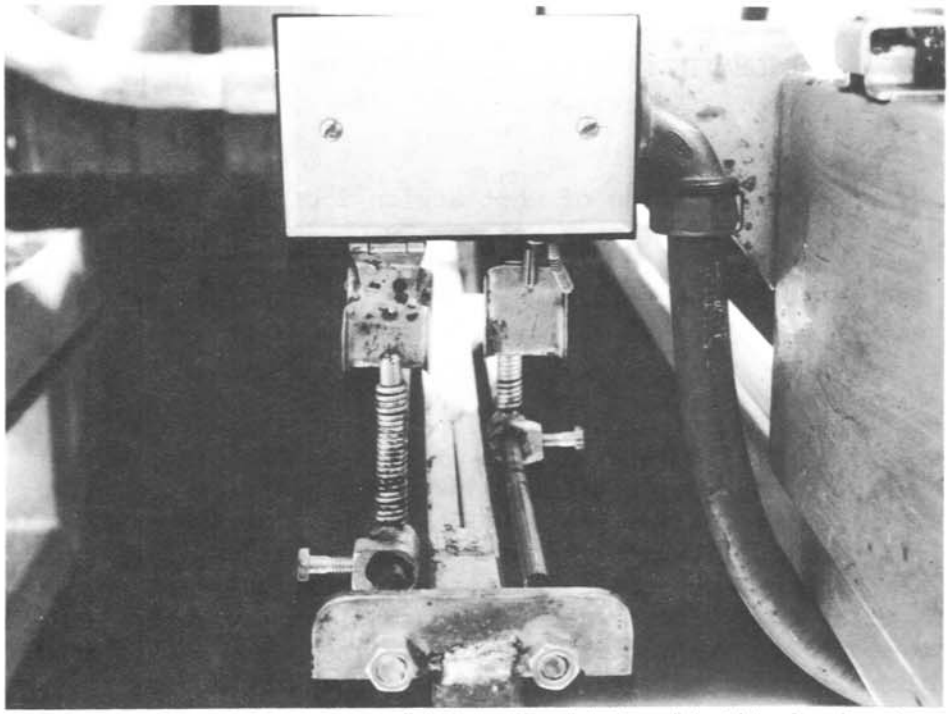
Photograph 2 below shows an adjustable limit switch assembly for a vertical slide gate also designed by Mr. Haun and on page 11, Photograph 3 shows a closeup view of the limit switch assembly for this vertical slide gate, and also note the toggle switches, activating levers, adjustment bolts, guides and supports.



Adjustable Limit Switch Assembly for Vertical Slide Gate

Photograph 2 (P602-D-70936)

In addition to providing a safety factor to the automated system, the device has been most beneficial in maintaining a more uniform flow rate. For example: a gate is open 2 feet and a large withdrawal occurs downstream. The float activated transmitter signals for the gate to open; the gate opens at intervals relative to the timer settings and continues to open until the water level shows a raise at the downstream end of the pool. By this time the gate may have opened to four feet. The control equipment has overcorrected and to compensate will cause the gate to fully close. A reverse situation will occur should a large withdrawal cease. In either case the gate would tend to hunt opening and closing before a null position is reached.



Close-up of limit switch assembly for vertical slide gate showing toggle switches, activating levers, adjustment bolts, guides and supports.

Photograph 3 (P602-D-70935)

This situation is more noticeable where the check gate and the downstream transmitter are two or three miles apart. The length of the water travel increases the time lag between the locations. In the above example the adjustable limit switch device would have been set to control the gate travel between 1.5 feet and 2.5 feet of opening.

Additional information regarding this idea may be obtained by writing to the Bureau of Reclamation, Regional Office, Region 2, 2800 Cottage Way, Sacramento, California 95825.

* * * * *

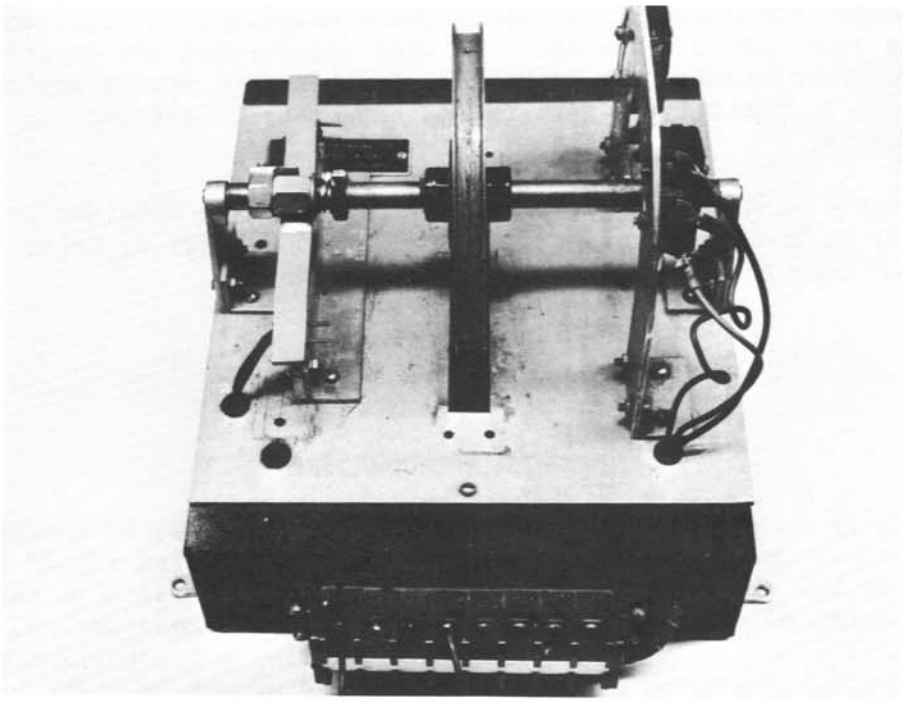
THOUGHTS ON MANAGEMENT

Excellence in performance must be sought for success in Government; and in Government excellence of performance manifests itself among other things in the advancing of methods and processes; in the improvement of everyday things, in more perfect organization, eliminating friction as well as waste; in bettering the condition of the working man, developing their faculties and promoting their happiness; and in the establishment of right relations with people and with the community.

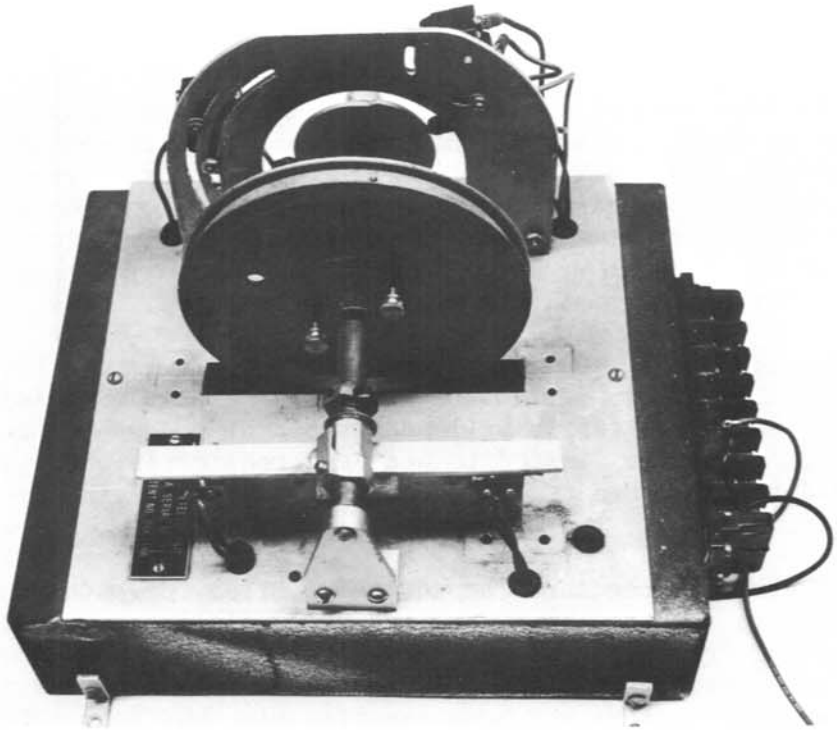
AUTOMATIC GATE CONTROL--ANTI-HUNT DEVICE
(Suggestion No. R2-71S-20)

Although a Region 1 version of what Region 2 calls an anti-hunt device has been in operation for many years, Region 2 development of a different device adaptable to the Region 2 "little man" occurred about 1966. The first Region 2 version consisted of two contacts and an adjustable friction clutch which cost about $100 per unit.

The Fresno Field Division then developed an improved version using metal to metal friction and smaller microswitches. The further improvement of this device offered in this suggestion by Mr. Jesse L. Scarbrough, Central Valley Project, Sacramento Valley Construction Office, Willows, California, is more economical than previous versions. It also has the added advantage of stationary microswitches instead of the moveable switches on the earlier versions. The modified version of the Cam and Micro-switch Assembly for the Little Man Control is shown in Photograph 1, below. The stationary feature increased the reliability a great deal. When the Fresno office was requested to fabricate several models they decided to replace their existing anti-hunt devices with the Willows version. A side view of this device can be seen in Photograph 2, on next page.



Photograph 1 (P602-D-70934)



Photograph 2 (P602-D-70933)

Submittal of this suggestion has been delayed until minor refinements in materials used in fabrication and size changes were accomplished. Subsequent to attaining the necessary reliability for the Willows anti-hunt device, it was combined with the original "little man" and some of the installed improved probe equipment to fully automate the Corning Canal Check gates from the downstream (one reach) station. The demand or downstream control system has operated for a period of more than 30 consecutive days without manual operation of any of the controls.

If further information is desired regarding this suggestion please write to: Bureau of Reclamation Regional Office, Region 2, 2800 Cottage Way, Sacramento, California 95825.

* * * * *

There is no more miserable human being than one in whom nothing is habitual but indecision.

LOSS PREVENTION

As we all know, one of the largest budget items of an Irrigation District or Canal Company is the upkeep and replacement of heavy equipment or light vehicles. A safety program has no provisions to cover a burned-up engine or a torn-out transmission, but a loss-prevention program considers everything and anything that can cause a loss of any kind to an organization. Loss prevention should be limited only by the imagination of those involved.

Some time ago the A & B Irrigation District, Rupert, Idaho, changed from a monthly safety meeting to what now is known as a loss-prevention meeting. Safety is fairly well understood by everyone, however, it has a tendency to become limited to accident considerations. Accidents in turn tend to fall into two (2) categories, personal injury and traffic accidents.

Meetings are held regularly on the third Friday of each month. All employees are required to attend and roll call is taken. Interesting meetings are essential, so special efforts are made to prevent them from deteriorating into dull routine affairs. Rotating employees as session leaders has been one effective way in maintaining interest. In addition to providing leaders that know their subjects this has provided the employee with an opportunity to develop or improve his speaking abilities. At the meeting, emphasis is placed on how to prevent a recurrence of a situation that resulted in an accident or a loss to the organization.

An effective tool to promote a loss-prevention program is to make the employees aware of the operating budget and if a saving is experienced at the end of the operating year, employees can be given a bonus. The District reported that its experience with this kind of loss prevention program resulted in the following:

1. Reduced absenteeism.
2. Labor turn-over was reduced.
3. There was noted improvement in operating efficiency.
4. There was a higher regard for the district by the community.
5. Operating costs were reduced.

The loss-prevention program and policies of the A & B Irrigation District is printed on the following pages. The first sheet is a signed statement and after being signed by the employee is filed in his personnel file.

A & B IRRIGATION DISTRICT, RUPERT, IDAHO

Date _____

To All Employees:

As you know the A & B Irrigation District has been following an active safety program. It has now been decided to change the program to a loss-prevention program. This, as the name implies, will increase our awareness in order to prevent loss to the district and to ourselves.

We intend to maintain a safe, pleasant organization. I am personally taking charge of our loss-prevention program, and to promote more effective results. The Electrical-Mechanical Chief has been appointed Loss Prevention Coordinator and is responsible to me for carrying out the details of a complete loss prevention program. He will work with each of the department supervisors in checking conditions, equipment, and operations, to suggest ways of decreasing losses due to accidents and unwise working practices.

Your supervisor is responsible for seeing that equipment and methods are safe; that you are given instruction in safe methods, and that loss prevention policies are followed.

All of us have a part to play in preventing loss, and you personally have the most to gain. Remember that 88% of all industrial accidents are caused by the unsafe acts of persons. 96% of all vehicle accidents are caused by drivers' "mistakes".

I SOLICIT YOUR HELP AND WANT YOU TO BE CONSTANTLY ALERT TO THE ACCIDENT HAZARDS OF YOUR JOB. Follow your supervisor's instructions, use plenty of good old "horse sense" and avoid the "thoughtless acts" that might cause loss to you, your fellow workers, or the equipment assigned to you.

Do not hesitate to bring in safety suggestions to your supervisor and to the regular monthly loss-prevention meeting.

Attached to this letter is a statement of loss prevention policy for you to read and study, so that you will know what is expected of the employees of the A & B Irrigation District.

Remember that every dollar saved through loss prevention is of benefit to us all.

Signed _____
Manager

Signed _____
President Board of Directors

I hereby certify that I have read the Loss Prevention Policy statement of the A & B Irrigation District, and I will abide by the rules and practices contained therein.

Signed _____
A & B Employee

LOSS PREVENTION POLICIES OF THE A & B IRRIGATION DISTRICT

Objectives

It is the policy of the A & B Irrigation District in its operations to give continuous management direction toward the provision of loss prevention among all employees, visitors and the public.

The welfare of all employees and the public is definitely the responsibility of the Manager and Supervisors, but loss prevention must be a united effort of management and each employee to insure the proper practices are not only established but followed. It is an integral part of the District's loss prevention policy that no job being performed by an employee is so important and no service is so urgent that time cannot be taken by all concerned to perform the work the right way -- the safe way. The purpose of this bulletin is to aid and assist those employees in the understanding and execution of safe practices and the development of safe working habits.

With the full cooperation of all employees of the district we feel that much will be accomplished by our efforts in the reduction of injuries and damaged equipment.

This bulletin is for your information, welfare and guidance - we urge you to follow the rules outlined in it. However it should be pointed out that the responsibility of the individual employee toward loss prevention is not limited to the rules and conditions specified in this bulletin, but rather takes in every phase of our work. You will be expected to carry out your duties at all times so as to prevent accidents or loss of any kind.

1. INDUSTRIAL LOSS PREVENTION

A. Give first aid, if qualified.

B. If necessary call the doctor (have someone do this while you stay with the victim).

C. Call an ambulance if it appears that ambulance services are needed.

D. Do not move the victim unless necessary to do so in order to prevent further complications of the injury.

2. REPORTING ACCIDENTS

A. In no case should an accident be regarded as just one of those things. All accidents, regardless of severity, should be reported to your immediate supervisor. Accidents involving minor injury will be given immediate first aid.

B. No employee will make any statement as to responsibility for an accident or injury in which he is involved. Such statements will be made only on the report submitted to the insurance company on their special report form.

3. ON THE JOB LOSS PREVENTION

A. Housekeeping. Each employee must accept the responsibility for keeping his work area free from hazards. This includes floors, stairways and aisles. Stacking and storage of materials must be planned to prevent falling or tripping hazards; oily or dirty rags will be disposed of in proper containers.

B. Guards. Guards and safety devices shall be kept in place around all machinery at all times. Exposed gears or belts will be guarded and regarded as hazards; they should be reported to the supervisor for corrective action at once.

C. Fire Precautions. Approved commercial liquids which are not injurious or flammable should be used for cleaning purposes. Fluids shall not be taken or used from any fire extinguisher for cleaning purposes. Care should be taken to insure that no open flame or sparks are generated when flammable materials are exposed.

The uniform rule in case of fire is: "SOUND THE ALARM, THEN FIGHT THE FIRE."

Each employee will be expected to know the location of the telephone or two-way radio and the fire extinguishers in his area.

Should a fire extinguisher be used, it will not be returned to its original storage point until it has been refilled or checked for completeness of charge.

D. Protective Clothing and Devices. Individuals will be expected to wear such protective clothing as will adequately meet the requirements for the type of work to which they are assigned. Certain items of protective equipment will be furnished by the district. When these items are furnished, workers will be expected to use them to the maximum.

Safety hats will be worn where there is danger of falling objects or bumping the head.

Eye protection will be used when grinding, in excessive dust, around compressed air tools or when strong winds are blowing materials so as to endanger the workers' eyes.

Respirators will be used when employees are exposed to excessive dust or spray or when harmful chemicals are in the atmosphere.

Gloves appropriate for the job and conditions will be worn by workers when such protection will be instrumental in preventing injury.

E. Horseplay. Any act of horseplay on work operations will not be tolerated. Practical jokes and misuse of the equipment for purpose of intended humor are prohibited.

F. Lifting. Before attempting to lift by hand an employee shall ascertain whether additional help will be needed to safely lift the load, and if necessary, get that help. He will make sure of good footing and hand holds, then lift with his legs using a free easy motion without jerking. An employee should never attempt to lift while off balance or in an awkward position.

4. ELECTRICAL SAFETY

The A & B District has 198 pumps in operation and each one is operated by electricity. Each substation and control cabinet should be regarded as a potential hazard. Remember that 50 volts is sufficient to cause death if you should happen to be properly grounded.

A. Under no circumstances are you to enter an energized substation without the approval of the Electrical-Mechanical Chief or Manager.

B. Your work regarding control cabinets is restricted to operating the start and stop button for motor operations. Under certain circumstances, after permission is obtained from the Manager, Electrical-Mechanical Chief, or Electrician, you may reset the overload relay once to start a motor. Persons other than qualified electrical personnel are not permitted to open any control cabinet doors other than those doors necessary to gain access to the stop and start buttons. Exceptions to this rule may be granted in certain circumstances by obtaining permission from the Manager, Electrical-Mechanical Chief, or an Electrician.

C. Never spray any enclosed substation area while the station is energized.

D. Never attempt any electrical repair on any district owned buildings, domestic pumps, furnaces, etc. Remember that around electricity your first mistake may be your last.

5. VEHICULAR LOSS PREVENTION

1. IN CASE OF AN ACCIDENT

   a. Call the enforcement agency, giving location and brief description of what has happened.

b. Stay at the scene until investigating officer excuses you. Collect names of witnesses and other data for completion of accident report card.

c. When accident has blocked roadway, assist in directing traffic until enforcement officer arrives.

d. See that all precautions are taken against fire or further destruction of property, by prohibiting unsafe acts by others.

2. REPORTING ACCIDENTS

a. In no case should an accident be regarded as just one of those things. All accidents, regardless of severity, should be reported to your immediate supervisor. Accidents involving vehicles on the streets and highways will be reported in accordance with the laws of this state.

b. No employee will make any statement as to responsibility for an accident in which he is involved. Such statements will be made only on the accident reports submitted to the insurance company on their special report form.

3. VEHICULAR SAFETY

a. Pre-operation Safety Check: Prior to operating any District vehicle, the driver will be responsible to check the vehicle to make sure it is in safe operating condition. This safety check will include, but not necessarily be limited to, the following:

(1) Tires - for inflation and road-worthy condition. Oil, water and fan belts.

(2) Brakes, lights, horn, wipers, directional indicators, and rear-view mirrors to see that they are complete and in operating condition.

(3) Safety equipment, to assure that it is in the vehicle and in working condition.

(4) A driver's vehicle report shall be completed on the form provided, at the end of each week on Friday evening. All privately owned vehicles used in district operations will be expected to be maintained to the safety standards required by state law.

b. Defensive Driving: Professional drivers realize that defensive driving is the key to accident-free safe operations. Defensive driving embraces more than legal responsibility - it

includes going all out for safety, doing everything within one's power to avoid involvement in an accident. Some defensive driving habits which employees are encouraged to develop are:

(1) Before moving any vehicle be sure to fasten the seat belt - it has been provided for your protection. The penalty for driving a district owned vehicle without the seat belt being fastened shall be one day's suspension from duty without pay.

(2) Govern speed primarily by the stopping distance required.

(3) Maintain all safety features of the vehicle in good working order.

(4) Always signal before turning, changing lanes or stopping. Be sure the signal is given in sufficient time to warn other drivers of your intentions. Plan your maneuvers far enough ahead to avoid hasty actions.

(5) Never pass another vehicle at intersections, railroad crossings, or where vision is limited or obstructed. Be absolutely sure that there is clear road ahead and that passing can be completed without crowding the vehicle being passed.

(6) Never compete for the right of way. The green light means "proceed with caution" to the defensive driver. Cars approaching from side roads probably will stop, but the defensive driver must be ready to avoid a collision if the driver does not.

(7) Stop signs and signals must be obeyed. This means a full and complete stop. After stopping, do not start again until movement can be made safely.

(8) Make certain that the vehicle is loaded properly and that the load is secured adequately before moving. If hauling gravel the load shall be leveled or arranged so that it will be impossible for the gravel to fall from the load while the truck is moving on the roads.

(9) No vehicle will be left unattended without the emergency brake securely set. In cases of severe grades, wheel chocks will be used and front wheels turned to rest against the curb on the downhill direction.

(10) Backing the vehicle will take place only after the driver has made absolutely certain that the way is clear behind. If there is a passenger in the vehicle, he should be used to direct the backing operation. In every case the driver will make an effort to park his vehicle so that he will not have to back.

c. Passengers: District owned vehicles, and ditchrider's private vehicles while on duty status, are business vehicles and should not be used as passenger conveyance excepting for district personnel and others who may have business reasons for such. Family members, relatives, and friends of district personnel, should refrain from riding in these vehicles because the District cannot assume any responsibility or liability for their safety and well being.

d. Safety Equipment on Vehicles: Safety equipment required by local or interstate regulations shall be carried on the vehicle at all times. It will be the driver's responsibility to assure that these items are in the vehicle and are in good condition. Any shortages will be reported to the supervisor and replacements made before putting the vehicle in service.

4. AWARDS

Safe Driver Awards will be presented annually to employees who maintain a record free from accident for a period of one or more years. Awards will be in the form of safe driver certificates for each year of accident-free driving, and safe driver pins will be presented beginning with the third year.

6. EQUIPMENT LOSS PREVENTION

The A & B Irrigation District has in operation at the present time more than $200,000.00 worth of moveable equipment. The principles of loss prevention must be applied to the operation and maintenance of this equipment. Proper operating techniques must be observed - such things as excessive racing of engines, rough handling of the clutch and gearshift, spinning of tires, etc., can cause hundreds of dollars worth of damage.

1. Heavy equipment operation: Equipment operators are expected to read the equipment manuals and become thoroughly familiar with the piece of equipment they are operating.

(a) Servicing: Each operator is expected to properly service his machine at regular intervals, being certain to use the proper series oil and the correct oil filter. If in doubt

call the Shop Foreman. Be sure to grease every fitting - one neglected fitting can cause a costly breakdown.

(b) Before starting the machine make a complete walk around inspection, being sure to look underneath, paying particular attention to oil and cooling system leaks.

(c) Do not leave any tractor idling with the gear shift in gear and the clutch disengaged - always take the tractor out of gear.

(d) Do not dismount from any dozer with the blade left in the air.

(e) On machines equipped with wire ropes be sure to make a visual inspection of the cable DAILY.

(f) In the event that any employee of the district causes any damage, however minor it may seem, to any privately owned property while operating any piece of equipment or vehicle it shall be reported as soon as possible to your supervisor so that corrective measures may be taken.

7. SUMMARY

It is the duty of all employees to report immediately to their supervisor any unsafe condition caused by motor vehicles, equipment, shop and garage or working condition which may jeopardize the safety of the employee himself, other employees or the public. It is also the duty of all employees to report to their superiors any unsafe practice carried on by other employees which jeopardizes that employee, other employees or the public. These reports may also be brought to the attention of the district loss prevention committee.

It will be the policy of the district to review any occurrence which causes a loss to the district; the purpose being to determine the cause in order to prevent a similar loss in the future.

We ask you to take time to do your job safely, thereby assuring yourself and your family of continued satisfactory service in the district.

Participate in the program. Make loss prevention a part of your operation and you will find that rather than taking more time the safe way becomes the efficient way.

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